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The development of educational policy in Russia during the Soviet period, 1917-1930, and the relationship of that policy to Russia's educational heritage was investigated. Analyzed was the extent to which educational policies under the new regime actually succeeded in departing from cultural patterns established in the older society. Since mathematics education is less susceptible than many other disciplines to ideological inroads, it provided a particularly good vehicle for determining the amount and quality of a key segment of cultural heritage transmitted from one generation to another. This research indicates that mathematics education has retained significant amounts of its heritage throughout the period. The probable significance of the Soviet experience for developing nations is clear: Ambitious educational borrowing from more advanced industrial countries, and bold new strokes of reform by revolutionary idealists, do not easily fit into the social and cultural context of the time and place. (RP)

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# *Reforms in Mathematics Education for Secondary Schools: Historical Trends in Russian and American Education*

February 1969

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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# REFORMS IN MATHEMATICS EDUCATION FOR SECONDARY SCHOOLS: HISTORICAL TRENDS IN RUSSIAN AND AMERICAN EDUCATION

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February 1969

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# SUMMARY

This study investigates a problem in the development of educational policy during the early Soviet period and the relationship of that policy to Russia's educational heritage. The problem emerges from the historical context of a revolution which declared a sharp cultural break with the value systems of the past. The question to determine is, to what extent did educational policies under the new regime actually succeed in departing from cultural patterns long established in the old society which, ideologically, represented "another world."

The study tests out the degrees of change and continuity in Russian culture, selecting educational policy, and in particular mathematics education, as an important element of culture. The period under analysis is 1917-1936. Since mathematics education is less susceptible than are many other disciplines to ideological inroads, it provides a particularly good vehicle for determining the amount and quality of a key segment of cultural heritage transmitted from one generation to another. Surprisingly little research into this question of cultural transition has thus far been produced on Russia, notwithstanding the abundant literature on her scientific and educational achievements in recent

years. This study thus contributes to much needed information on this problem and also to the growing knowledge about kinds of problems and alternative solutions that educational policy-makers in developing countries -- similar to Russia at the time -- must face. More specifically, the research aims to find out if, and to what degree, Soviet innovations in educational policy proved functional in the context of the on-going cultural and social systems in society.

The historical policy analysis has examined major legislations on education and social change, the curricular plans established for the different levels of education, the standards of teacher preparation, textbooks and classroom methods used in instruction, and the ideological-philosophical backgrounds of changes in educational policies. Extensive use of monographic and periodical sources in Russian was essential to this work. A field visit to the USSR, where additional materials and educators as sources could be available, was not feasible for this researcher. The documentation gathered from national and international library sources has proved fully adequate for the objectives of the study, however.

In the Soviet Government's attempt to restructure the educational institution, and to find radically new functions for mathematics and science, its policies were guided or influenced by three main considerations. The first was clearly a new ideology, philosophically derived from official Marxism-Leninism, which declared knowledge to be a social phenomenon and the instrument of a dominating economic class. Knowledge and its instruction should therefore relate to the needs and interests of that class. Radically motivated educators thus sought to make knowledge *per se* subservient to social learnings and tasks useful to the industrialization program, ruled over by the "working class." A second condsideration was the actual material and social resources at the Government's disposal. The third was the weight of tradition, which impinged constantly on the emerging present.

In each of the three major periods of Soviet policy development during 1917-1936, educational authorities found themselves contending constantly with these interacting factors. More often than not, the outcomes of these confrontations were an impasse in official educational policy-making, resulting in both a substantial continuity of educational principles and practices -- policy -- from the past, and a creative tendency to innovate at the local and provincial levels of administration. This later development drew its educational ideas and resources from prerevolutionary progressive movements, from certain still older traditions, and also from new proposals of the revolutionary regime. This somewhat vascillating, if not occasionally chaotic, state of affairs came to an end when Soviet economic planners established firm goals for national development. Then, the ambivalent, paradoxical features of educational policy gave way to the hard necessity of fixing its educational objectives to conform to the basic, long-range needs of society as defined by the regime. This imposition of a strongly teleological orientation to Soviet education brought with it an increased reliance on traditional educational principles and methods -- an important aspect of Imperial Russian culture. Substantial reversions to "tried-and-tested" education occurred: academic values, such as the integrity of disciplines; imperial textbooks; traditional classroom methods, including types of rewards and punishments; hierarchical organization in education; rigid selection criteria; etc. This research shows, however, that mathematics education had retained significant amounts of that heritage throughout the period. In the light of most other studies of Soviet educational development, this latter observation is a significant finding and has implications for reassessing the history of Soviet educational policy.

The main input of Soviet-derived educational policy after 1930 was its insistence on mathematics-science as the core of general education in the secondary school, replacing the humanities of the Imperial gymnasium but following the pattern of the Real gymnasium. The Soviet position -- the "new wine" -- reflected of course the materialistic bias of an industrializing society and the ideological overtones of a proletarian social policy in the schools.

In studying this aspect of the Soviet experience in educational policy, this researcher/author found what he terms the "pendulum-like" effect that the regime's encounter with the two major problems produced. This pendulum effect resulted from the interplay between "change" and "continuity" -- the ideological commitment to transform the environment, and the historical fact that a cultural heritage could not be denied. Soviet society could move or progress because it had inherited means to do so. While the Imperial Russian heritage thus exerted a not insignificant influence on the development of Soviet educational policy, we cannot discount the unique achievements of Soviet educators themselves. By examining closely the course of mathematics education, both before and after 1917, the writer has been able to document the ambivalent, if not paradoxical, nature of Soviet education throughout the period under review.

The probable significance of Soviet experience for developing nations is clear: ambitious educational borrowing from more advanced industrial countries, and bold new strokes of reform by revolutionary idealists, do not easily, if at all, fit into the social and cultural context of the time and place. It indicates that the educational policies and pedagogical practices find their organic links with the on-going social and economic systems at the grass-roots level. In the Russian case, this meant a substantial resumption of traditional educational ideas and practices. Hence, while the conflict between ideology, reality, and cultural heritage compounds the work of educational policy-makers, a pragmatic and flexible assessment of these factors can serve as the raison d'être for genuine economic and cultural progress.

In view of these conclusions and observations, the author must classify the period studied as the most interesting and critical one for general educational policy in the entire Soviet period. It was the formative, searching, experimental, shaping period during which Soviet mathematics education sought its proper character and place in Soviet culture. The change agents found that they could not give it that character and place without conceding to the Imperial heritage its role in the continuing present.

# CHAPTER I

# THE NATURE OF EDUCATIONAL POLICY STUDY IN THE RUSSIAN CONTEXT

## Introduction

The study of educational policy in any nation implies an examination of the types of educational institutions designed to effect the desired goals and objectives. In industrial or modern societies these various institutions ordinarily are organized into several parallel structures, each structure pursuing a specific goal and incorporating a particular sequence of studies spanning elementary to more comprehensive types of institutions. Taken collectively, these parallel structures constitute a system of education, specifically, the structural framework of such a system. Both the Imperial and Soviet educational systems visibly embody two underlying structures--a general or popular education structure and a vocational/technical or professional structure. To these the Soviet system added a new political structure of education.[1] For both historical periods, the hierarchy of institutional forms within each structure is divided into elementary, secondary, and higher educational levels.

Why is it even necessary to consider Imperial institutional structures in a study supposedly confined to an analysis of Soviet educational policy? Lenin himself provided a rationale when he stated in his address at the Third All-Russian Congress of the Young Communist

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[1] The religious structure and curricular requirements of the Imperial system of education in one sense, in terms of their doctrinaire orientation, are the counterpart of Soviet political education.

League, on October 2, 1920: "We can build Communism only from the sum of knowledge, organizations and institutions, only with the stock of human forces and means that were bequeathed to us by the old society."[2] Many of the educational policies undertaken by the first Soviet RSFSR Commissar of Education, A. V. Lunacharskii (1917-1929) reflect Lenin's admonition.[3] This is not to negate the significance of the revolutionary goals that Lenin placed before Soviet education, for he too in the same speech to the Young Communist League stressed: "Only by radically recasting the teaching, organization and training of the youth can we ensure that the efforts of the younger generation will be the creation of a society that will be unlike the old society, i.e., a communist society."[4] However, the "pendulum effect" of Soviet education, that is, its movement between policy aims and the actual means for their implementation--between policy and practice--, tempered mostly by economic requirements of the country, evinced numerous instances of continuity between the two societies, with respect both to forms and to methods of education. Alexander Korol concluded that, "in many essential respects the educational system under Soviet rule has in fact reverted to pre-Revolutionary forms and practices."[5] If this is so, the transference, to a greater or lesser degree, into the Soviet era of certain traditional types of educational institutions and methodologies necessitates retrospective considerations to account for that process. Such study should put Soviet educational policy into more realistic perspective by identifying the historical precedents and past experiences that have been "brought to bear normatively (regulatively) upon the problems of the institution within the developing present."[6]

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[2] Cited by Sergei I. Vavilov, The Progress of Soviet Science (London: Foreign Languages Publishing House, 1951), p. 34.

[3] The unpublished Ph. D. dissertation of Ruth C. Widmayer, "The Communist Party and the Soviet School--1917 0 1937" (Department of Government, Radcliffe College, Harvard University, 1954) emphasizes Lunacharskii's esteem for valuable pre-Revolutionary institutions and traditions [ especially pp. 45-46 ].

[4] Vavilov, loc. cit.

[5] Alexander Korol, Soviet Education for Science and Technology (New York: John Wiley & Sons, Inc., 1957), p. 131.

Cyril Black, the historian, offers a useful interpretation for the adoption of cultural institutions peculiar to either or both epochs when he sees the modernization of Russia coming, first, as a "defensive and superficial" phase, and second, as an "aggressive and more thoroughgoing" phase[7]--that is, the Imperial and early Soviet periods, respectively. This analogy is particularly appropriate to educational development, wherein the stimuli for the innovation or re-introduction of educational measures were dictated largely by the cultural and economic needs of the respective societies at the time, but which were acted upon with differing degrees of urgency.

## Statement of the problem

This work undertakes to study a problem in the development of educational policy during the early Soviet period and the relationship of that policy to Russia's educational heritage. The problem emerges from the following sequence of historical observations--the last item of which defines the problem itself:

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[6] Stanley E. Ballinger, The Nature and Function of Educational Policy, Occasional Paper No. 65-101 of the Center for the Study of Educational Policy, May, 1965, Department of History & Philosophy of Education, Indiana University (Bloomington: Indiana University, 1965), p. 14.

[7] Cyril E. Black, "The Modernization of Russian Society," The Transformation of Russian Society, ed. Cyril E. Black (Cambridge: Harvard University Press, 1960), p. 662.

a. The political break with the past of the Russian Empire in 1917 appeared to have deep implications for the direction of Russian "culture," i.e., the total value system and practical concerns of Russian society;

b. Education, including the more explicit category of "mathematics education," is a part of culture and, therefore, is involved in the transition from "the old" to "the new."

c. What evidences from the history of Soviet education, especially that relating to mathematics education, bear upon the continuity and discontinuity of early Soviet Russian culture with the Imperial Russian past? What, then, was the nature of educational policy in mathematics education during the formative years of Soviet education--during 1917-1936?

In essence, a political upheaval wrought change upon many areas of Russian culture, but to what extent did it affect the area of education? The term "education," having numerous connotations, here applies primarily to educational policy, as opposed to educational practice. It is also restricted, for the most part, to mathematics education at the elementary and secondary levels of education.

Since the prime focus of the study, then, is the development of educational policy, both the contents of mathematics programs and the methods of teaching mathematics are drawn upon only as they reflect and offer an insight into the general educational policy adopted or proposed by the new regime. That is, the study does not aim to provide detailed descriptions and analyses of mathematics education per se, but only utilizes such material as a vehicle to understand better the conduct of educational policy (including its formulation, functioning, and changes) during the first two decades of the existence of the Soviet regime.

Intrinsic to the study of the development of any social institution in a new society is the extent to which it departs from its former manner of functioning in the "old society." Three evidences can be drawn from the historiography of Soviet education, which, if accurate, raise contradictions in the supposed development of mathematics education, as officially recorded. They are as follows:

1) Soviet mathematics-science education, in general, as opposed to that in the social sciences, has achieved a position of unprecedented international renown and respect since 1917--to the extent that Soviet technical science has assumed world leadership in certain key fields;

2) The social revolution in 1917 purportedly marked an "entirely new phase" in scientific-educational development, which threatened to alienate those teachers of the former Imperial society who refused to work under the new conditions, which were to guide the reconstruction of a Soviet society. The State sought to initiate whole new programs of scientific-educational thought and training--unique in both theory and practice;

3) During 1931-1936, through decrees and directives relating to all levels of education, the Soviet government reintroduced into its program of educational and social development many pre-Revolutionary criteria, which had implications for the type of policy pursued in education generally, and in mathematics education specifically.

Although these evidences appear to be valid, actual investigations imply that a high level of continuity with Imperial Russia in both the theory and practice of education probably prevailed during the first two decades of transition and reform. This appeared to be the case even prior to the 1931-1936 period of official reform restoring many facets of Imperial Russian education, regardless of which of the following major aspects of educational policy one considers: organizational structure, cognitive content, or methodological practice--the "where," "what," and "how" of educational policy, respectively.

Thus, in studying the development of Soviet educational policy, the intervening nature of this suspected anachronism between the radical, experimental, progressive educational policy of the first dozen years of the Soviet regime and that of the restitution of many traditional principles and practices of Imperial educational policy in the early 1930's will constitute the unifying theme of the ensuing research.

While the study will emphasize the policy aspect of education, as opposed to actual educational practices in the schools, the latter will be introduced whenever they shed additional light on the viability of such policies. One may reasonably expect a disparity between policy and practice to be indicative of a certain degree of continuity between pre- and post-1917 Russian education, which probably reflected a compromise between attitudes and conditions as they were officially perceived and as they actually existed. The realities surrounding a system of education constantly impinge upon and moderate the extent to which the policy framing its functioning is carried out. The degree of effectiveness of a policy, therefore, be it in education or elsewhere, may well be contingent upon its compatibility with the prevailing nature of the environment in which it is introduced. The Soviet Government, via the Communist Party, subscribed to the new and radical political ideology of Marxism-Leninism, which by its very nature would seem to exert a telling effect on educational policy at the time. The greater the resistance in practice to changes embodied in such new educational policy, the greater the degree of continuity with the displaced educational policy.

The rationale for limiting the study of educational policy primarily to its relation to the teaching of mathematics is threefold:

1) Admittedly, education is only one aspect of culture, educational policy is only one aspect of education, and the teaching of mathematics is only one aspect of educational policy, but perhaps the unique characteristics of mathematics, the essence of the technical sciences, make it relatively less susceptible to Soviet ideology, more closely akin to practical needs, and thus, more revealing of continuities and changes in the development of Soviet educational policy specifically, and Soviet culture generally;

2) Relating educational development in one particular academic discipline--mathematics--lends increased objectivity to the study of Soviet educational policy;

3) An analysis of a particular disciplinary area of study provides a "grass-roots" approach to the study of educational policy development, thereby making it more meaningful and vibrant, in contrast to the usual theoretical and sometimes often biased approaches to this important aspect of education. As such, it provides a useful and feasible methodological device for testing out the actual, as against ideological or "propagandistic," contexts of Soviet educational policy in a past period of history.

Essentially, the study attempts to describe and to analyze the development of Soviet educational policy, primarily within the context of mathematics education, placing an emphasis on change in such policy and the rationale for such change. Since the concept of change implies some deviation from the existing normative standard, the continuation of certain aspects of educational policy assumes significance not for what has been done, but rather, as a result of what has remained in operation, either explicitly or implicitly. In effect, this continuation reflects an endorsement of that which has existed. The concepts of "change" and "continuity" are so interdependent and inextricably related to the problem of educational policy that "change in educational policy" and "continuity in educational policy" may be perceived as two different approaches to the same problem--*the dynamics of educational policy*--such that either "the new" or "the old" becomes the prime focus of study, respectively. In this case, the principal emphasis is on change in Soviet educational policy, which unavoidably also involves examination of the process of continuity.

The concepts of change and continuity in educational policy are meaningless if there is no standard or criterion against which to gauge deviations from its normative conduct. Hence, while the study entails numerous vertical, internal comparisons, wherein the educational policy of one chronological Soviet period is weighed against that of another, an understanding of educational policy prior to the assumption of power by the Soviet communist regime is imperative for two reasons: first, it provides a "launching-off" point for Soviet educational policy--the basis on which early Soviet education had to be constructed; second, due to the constant distinction in Soviet sources between Imperial (or pre-Revolutionary) and Soviet educational policy and practice, it is important for this research to identify Imperial Russian educational policy generally, and Imperial mathematics educational policy specifically.

Thus, generally speaking, in order to put Soviet developments in education into more meaningful perspective, especially with regard to the problem of continuity and change in educational policy between Imperial and Soviet Russia, Chapter II of the study will be devoted entirely to the Imperial period of education. Unlike the discussion of the development of Soviet educational policy, which is restricted primarily to the elementary and secondary levels of education, Chapter II, while stressing less the particulars of mathematics instruction, will also include a discussion of policy development as it related to both teacher training and higher education. The purpose here is to convey a complete picture of the educational framework, especially the organizational structure, on which Soviet education had to build. Although certain aspects of Soviet higher education are either touched upon or alluded to in isolated endeavors to complement and to depict implications of certain developments at the elementary and secondary levels of Soviet education, the study of educational policy at this level, relating to pedagogical or scientific research functions therein, is suggested as a topic for future historical educational research for the 1917-1936 period.

As these comments on "change" and "continuity" indicate, a consideration of the development of educational policy can lead to some very theoretical, abstract, and provocative discussions. Stanley E. Ballinger in, The Nature and Function of Educational Policy, addresses himself to the theoretical aspects of policy development, while James B. Conant offers a general, institutional approach (covering both the public schools and higher education), stressing the administrative aspects of the formulation of educational policy in the United States in Shaping Educational Policy (New York: McGraw-Hill Book Co., 1964). Both of these works suffer from the same drawback--a failure to bring educational policy down to a more functional level. While the former study offers a variety of terms, concepts, and definitions which facilitate an understanding of educational policy within the framework of education generally, it is simply too deductive, too hypothetical in its dimensions, for purposes of studying change in educational policy. Such sources as the History of Russian Educational Policy, 1701-1917 (New York: Russell & Russell Inc., 1964) by Nicholas A. Hans and the latter's collaboration with Sergius Hessen in Educational Policy in Soviet Russia (London: P. S. King & Son, Ltd., 1930) are examples of studies more valuable for their closer case examination of the intricacies of policy development. Indicative of the not infrequent, yet impracticable, tendency to impute the wrong relative value to certain facets of Soviet educational policy, such as covering the 1920's reforms from primarily political-ideological positions, rather than from more representative, substantive, and realistic perspectives are the following: Oscar Anweiler and Klaus Meyer, Die sowjetische Bildungspolitik seit 1917 (Heidelberg: Quelle and Meyer, 1961); L. Volpicelli, L'Evolution de la Pédagogie Soviétique (Neuchâtel: Delachaux et Niestlé, 1954); and George S. Counts, The Challenge of Soviet Education (New York: McGraw-Hill Book Co., 1957). The point stressed here is that the field of education is in need of more inductive type of approaches to the study of the conduct of educational policy, and the lack of genuine case studies in this area indeed represents a shortcoming of much research already conducted. As typified by the works of Hans, even the relatively few "case studies approaches" to the problem of educational policy development have tended to be too broad in scope to be really discerning and definitive about change and continuity in educational policy. The inadequacies of previous research in this area, therefore, amount not so much to "sins of commission" as to "sins of omission!" This study, which attempts to study the conduct of educational policy primarily with regard to developments in a particular disciplinary area (mathematics) of the educational process, is an effort to fill a lacuna left by previous research in this field.

It is only through such an analysis of the change and continuity abounding in different degrees within the various academic branches of education, either between Soviet and Imperial Russia or between different chronological periods in Soviet Russia itself, that Russian education, as a whole, can realistically be put in its proper perspective. The study of educational policy as it pertains to the specific area of mathematics education at the elementary/secondary level, is only the beginning phase in the total research required. This little used approach to the study of the development of educational policy has significance both for the field of education and for Russian/Soviet culture, as suggested in the paragraphs below.

## Significance of the study

"It is natural that the revolution of 1917 should have exerted a powerful attraction for students of Russia," claims Cyril E. Black, "but the result has been a focusing of interest in the latest developments and a tendency to treat events before and since the revolution in separate compartments."[8] While the question of continuity and change may appear to some as a naive and unsophisticated approach to social history, "since it is clear that every social process has continuity at the same time change is taking place, it is nevertheless a convenient device for sorting out certain distinctive trends."[9] One such trend, of course, is the discord between "old" and "new" educational policy (and practice) in a society subscribing to a new political ideology, the implications of which for the technical sciences cannot be discounted. This process is reversible, that is, through analyses of certain trends, the researcher is able to discern continuity. The absence of such studies dealing with the question of continuity in Russian education after the Revolution suggests a need for information.

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[8] Cyril E. Black, "Introduction," The Transformation of Russian Society (Cambridge: Harvard University Press, 1960), p. 3.

The issue is not whether or not educational continuity prevailed, but rather, the characteristics surrounding this phenomenon and the degree to which it existed, at least in mathematics education, at certain significant stages in the evolution of Soviet educational policy. As one observer indicates:

> "There still is a considerable number of intellectuals of upper-class and middle-class origin who survived intervening upheavals and who have become an integral part of the new intelligentsia. Naturally, this has been more common in less political and less prominent domains, and may have involved disguising of actual social origin. For these reasons, the details of this element of continuity from intermediate to new intelligentsia remain at best obscure, although the fact is itself unquestionable."[10] (Italics mine.)

Russia has enjoyed varying degrees of success in education, most prominently in mathematics-science education, at various stages in her ascent as an international power. Peter the Great (1689-1724) is generally accredited with having first launched this successful drive for scientific achievement. Despite its late and often slow development, Russian education accumulated a vast store of scientific knowledge and techniques, unique contributions, and teaching methodologies, and thereby acquired a sound reputation in the exact sciences. Prior to the 1917 Revolution there was an appreciable sense of unity in Russian education, although political reaction superficially shielded this tendency, thus minimizing its steady continuous growth, and in some respects conveying the false notion of general discontinuity in its progressive development. Even under the most trying of academic conditions, Imperial mathematics-science education as a whole managed to maintain its integrity, while simultaneously building upon the achievements of its predecessors. The "Golden Age" of Russian science, as is so often called the harsh conservative reign of Nicholas II (1894-1917), attests to this anomaly.

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[9] *Ibid*., p. 7.

[10] George Fischer, "The Intelligentsia and Russia," *The Transformation of Russian Society*, ed. Cyril E. Black (Cambridge: Harvard University Press, 1960), p. 269.

Yet, the temptation to treat Imperial Russia and Soviet Russia as two loosely connected episodes in the history of Russian education and science colors much of the literature on Soviet culture. Propagandistic phrases similar to the following are quite common:

> The program of the Soviet Minister of Education [in 1919], which followed the Bolshevik success, has no connection with the official inheritance in the educational field, which the Romanovs left. It was to be a working out of the most radical of the tendencies which the Czar and his ministry were most active in supressing.[11]

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[11] Ruth C. Widmayer, "The Communist Party and the Soviet School--1917-1937" (unpublished Ph. D. dissertation, Department of Government, Radcliffe College, Harvard University, 1954), p. 17, quoting "a student of Russian education" in Sochineniia [Collected Works], Vol. 30, p. 410.

> As a result of the victory of Soviet power in our country a *cultural* revolution was realized. Part and parcel of the program of cultural revolution was the construction of the Soviet higher school in *radical distinction* from the pre-Revolutionary higher schools.......................................................
> The implementation of this basic task demanded the *quick liquidation* of the prevalence in universities of the bourgeois professorate, opening of the wide access to studies in higher educational institutions to workers and peasants, and revision of the whole system of education in accordance with the new aims.[12] (Italics mine.)

> On acquaintance with academic institutions, and also with the new, independent institutions which had sprung up since the establishment of Soviet power, it became clear to the assembled scientists, Soviet and foreign, that in a few short years Russia's old science, so limited despite its merits, had grown up into a big new science, steadily and rapidly advancing--*a science new, not only in scope, but in its very nature*.[13] (Italics mine.)

Counterbalancing these pronouncements, however, are such realistic admissions of continuity as:

> This struggle for culture and education has been of a twofold nature: on the one hand it is a struggle for mastery of the entire knowledge accumulated by mankind in the past - a heritage which the Bolsheviks in no wise reject; on the other, it is a struggle for the creation of a new culture, proletarian in character.[14]

> Thus, Soviet science has become the heir of and successor to all scientific achievements of the past, of the best traditions of genuine advanced science of all times and peoples, and in the first place, of the progressive traditions of Russian science.[15]

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[12] E. V. Chutkerashvili, *Razvitie vysshego obrazovaniia* [The Development of Higher Education] (Moscow: Gosudarstvennoe izdatel'stvo "vysshaia shkola," 1961), pp. 3, 9.

[13] Vavilov, *op. cit*., pp. 38-39.

[14] Albert P. Pinkevich, *Science and Education in the U.S.S.R.* (London: Victor Gollancz Ltd., 1935), p. 13.

[15] Modest I. Rubinstein, *Soviet Science and Technique in the Service of Building Communism in the U.S.S.R.* (Moscow: Foreign Languages Publishing House, 1954), p. 103.

> In the beginning of the restoration period in the higher educational institutions the old bourgeois professorate continued to play the master.[16]

However, even these more realistic assessments tend to stress the transitory nature of pre-Revolutionary influences on early Soviet education and science. They either imply that there was a *delay* in achieving an almost total renovation of Imperial Russian culture, including education and science, or they are prone to put continuity with Imperial Russia on a *conditional basis*--again stressing the distinctness of Soviet culture. As an example, the 1921-1925 period is popularly put forth as "a turning point in the history of the Soviet higher school," and that "toward the end of this period the higher school became qualitatively new."[17] Similarly, the new programs for the principal Soviet elementary-secondary educational institution, the Unified Labor School, were prepared and issued *in 1923* by the State Scientific Council to

> ...provide *new* materials...presuppose *new* methods...place at the basis of the whole educative process an *entirely new* direction of the child's will, a direction which is contemporary and revolutionary-proletarian [in character]....[18]

But in reality was the difference between Imperial Russian and Soviet Russian educational policy, and such closely related aspects of Russian culture as science, as pronounced as much of the pertinent literature would seem to indicate? This is an important consideration, since one would expect a comparison of dissimilarities and similarities in such areas over the two epochs to favor heavily the latter, if indeed there was a high degree of cultural continuity.

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[16] Chutkerashvili, *op. cit.*, p. 11.

[17] *Ibid.*

[18] *Novye programmy dlia edinoi trudovoi shkoly. Vyp. I. 1-i i 2-i gody shkoly pervoi stupeni i 1-i god shkoly II stupeni* [New Programs for the Unified Labor School. Part I. First and Second Years of the First-Level School and First Year of the Second-Level School] (Moscow: Gosizdat, 1923), cited by George S. Counts, *The Challenge of Soviet Education* (New York: McGraw-Hill Book Company, Inc., 1957), p. 63.

The significance of this study goes beyond the specific objectives to be sought, however. It was during the 1917-1936 period, especially the restoration of essentially traditional-Imperial educational practices, that the character of Soviet educational policy, as we know it today, was shaped. In addition, this study contains implications for social theory, especially with regard to culture change--a fact not insignificant in an age where there is an ever increasing need to bridge the gap between science and the humanities in an attempt to keep technological growth within the framework of social controls at man's disposal. Evidence of this growing field of inquiry is suggested by the recent compilation by the National Science Foundation Current Projects on Economic and Social Implications of Science and Technology, 1964 (Washington: U.S. Government Printing Office, 1965), which lists current research projects dealing with the social and economic impacts of science and technology. Furthermore, whereas the advance of Soviet mathematics and the mathematical sciences continues to have an impact on our own society, the implications of the Soviet experience for American programs of mathematics and science instruction in fostering such progress remain unexamined. The proponents of a national curriculum at various levels in our American educational process, a vociferous faction discontented by the rate of progress at a time of acute technological competition, as well as their opponents, would do well to entertain an interest in the historical antecedents in culture of centralized control of subject matter and its dissemination. Findings of this nature transcend international boundaries because of cultural competition and similarities among modern industrial societies, such as those of the Soviet Union and the United States.

## Notes on sources

A survey of the related literature suggests not only a lack of attention to this problem of change and continuity in Soviet educational policy during its first two decades of formulation, but also a common tendency to deal in platitudes and generalities. Nicholas DeWitt's Education and Professional Employment in the USSR (Washington: Government Printing Office, 1961) is extremely valuable as an encyclopedic reference work on Soviet education, but it tends to gloss over significant historical events and offers very little in the way of interpretative analysis.[19] The works of Hans on educational policy in both the

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[19] More specifically, DeWitt runs the ladder of the Soviet educational system, but utilizes a scheme of grouping by general scientific branches and general curricula (i.e., mathematics, physics, and chemistry comprise the "Sciences" branch of the "General academic subjects" curriculum), and only deals directly with specific fields of knowledge in statistically depicting contemporary curricula (including the subject of "Higher mathematics") of particular engineering specialties or in depicting distributions of scientific personnel (including those in the "physical-mathematical" field) [see Appendices to Chapters IV and V, pp. 627-749, 751-775, respectively]--limiting methodological and theoretical considerations to the breakdown of subjects of specific specialties by type of instruction ("lecture, laboratory, and seminar & practice session") [as in Table IV-B-17, p. 738] and to broad generalizations.

Noteworthy also is the thorough, almost encyclopedic, approach of Alexander Vucinich in Science in Russian Culture (Stanford: Stanford University, 1963), where on p. xv, he states that "in pre-reform Russia there were four basic types of scientific institution [sic]: the academy, the university, the voluntary of semi-independent learned society, and the government agency"--apparently minimizing the role of the elementary and secondary institution as scientific institutions.

Imperial and Soviet Russian periods, cited earlier, despite their rather mediocre and sketchy coverage of specific aspects of the instructional process, such as mathematics, are most valuable and reliable sources of data, which are not devoid of insightful interpretations of such data. To them must be added William H. Johnson's Russia's Educational Heritage (Pittsburgh: Carnegie Press, 1950), which is more important for its historical documentation than for its relevance to educational policy in Imperial Russia.

Soviet educational policy cannot be studied apart from the Soviet philosophy of Marxism-Leninism as it relates to education and science (including mathematics), since this ideological superstructure forms, or is purported to form, the basis for the functioning of all aspects--social, cultural, and economic--of Soviet society. Both David Joravsky's Soviet Marxism and Natural Science, 1917-1932 (New York: Columbia University Press, 1961) and Loren R. Graham's The Transformation of Russian Science and the Academy of Sciences, 1927-1932 (unpublished Ph. D. dissertation, Department of History, Columbia University, 1964) offer a philosophical basis for shifts in Soviet science policy, but do not consider the educational implications precipitating or resulting from such changes. Robert Solo in Economic Organizations and Social Systems (New York: The Bobbs-Merrill Company, Inc., 1967) not only identifies well the "cultural system" or interconnecting set of values to which Soviet society is dedicated, but also discusses its place in a conceptual framework or systems analysis for studying some functional system, such as educational policy. The numerous works of the Soviet scientist, Sergei I. Vavilov, while greatly propagandistic in content, nonetheless vividly depict the Soviet conception of Marxism-Leninism as the unity of theory and practice, thereby enabling the historical researcher better to gain a feeling for the ideological orientation of the period in which he works. Chapter III of the study lays the philosophical framework for the development of Soviet educational policy.

While this study does not purport to offer a comprehensive probe of the practice of educational policy, an attempt is made, as already indicated, to determine, wherever feasible, the viability of certain facets of Soviet educational policy. Experience with Soviet research has shown that, particularly up to the 1929 purges of persons alien to the current Party ideology, accounts in certain of the scientific-educational periodicals are fairly objective in their reporting of conditions in education, both as they were observed to exist and as they were debated in formal and informal policy discussions. The two most prominent periodicals in this regard are: Nauchnyi rabotnik /‾Scientific Worker_7, published monthly from 1925-1930 as an organ of the Central Council of the Section of Scientific Workers of the Union of Workers of the Enlightenment USSR, and Front nauki i tekhniki /‾Front of Science and Engineering_7, published monthly from 1929-1938 (in 1929 through April 1931 as VARNITSO) as an organ of the Association of Scientific and Technical Workers for Support to Socialist Construction (abbreviated as VARNITSO).[20] Another excellent periodical is Matematika v shkole /‾Mathematics in the School_7, which was first published in 1934-1936 as

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[20] Nauchnyi rabotnik merged with Front nauki i tekhniki in 1931, apparently because it was not radically enough attuned to Communist Party propaganda on science.

*Matematika i fizika v srednei shkole* [Mathematics and Physics in the Secondary School]. While this periodical began publication during the final years of the period surveyed by this research, its primary value stems mostly from the frequent inclusion in its more current issues (particularly those of 1947 and 1949) of articles dealing with the history of methods of teaching mathematics at the elementary and secondary level.

The *Essays on the History of the Soviet School and Pedagogy 1921-1931* [Ocherki po istorii sovetskii shkoly i pedagogiki 1921-1931] of F. F. Korolev *et al*. (Moscow: Izd. Akademii Ped. Nauk RSFSR, 1961) is undoubtedly the most reliable and authoritative Soviet account of the development of Soviet educational policy during the critical 1921-1931 phase of this study. Its significance results from its frequent documentation with archival matter--one valuable source of research data which has often been denied the foreign researcher in the Soviet Union. "The Communist Party and the Soviet School--1917-1937" by Ruth C. Widmayer (unpublished Ph. D. dissertation, Department of Government, Radcliffe College, Harvard University, 1954), while covering roughly the same chronological period encompassed by this study and making a good case for the dominant role of the Communist Party in the formulation of Soviet educational policy, in many respects degenerates into a kaleidoscopic review of generally unrelated educational events and institutions, whose interconnections are little apparent. Two other doctoral dissertations are less germane to the focus of this study, but offer additional background material, which is complementary in scope: Bruce R. Vogeli's "The Mathematics Program of the Soviet Secondary School: Its

Status and Innovations" (unpublished Ph. D. dissertation, School of Education, University of Michigan, 1959) deals almost exclusively with the 1958 reforms in mathematics teaching as compared with the mathematics program of 1952-1953; Fredrika M. Tandler in "The Workers' Faculty (RABFAK) System in the USSR (unpublished Ph. D. dissertation, Teachers' College, Columbia University, 1955) undertakes to study an institution, which comprised a relatively small proportion of secondary (-adult) education from 1919-1940 in the Soviet Union--treating the teaching of mathematics and the other disciplines in a somewhat superficial manner.

The nature of this research accounts for the wide variation in the nature of the sources on which it draws--general education, mathematics education, cultural history, economics, science, philosophy, and political science--, all of which are drawn together under the rubric of history. Due to the need for such a rather interdisciplinary approach to the development of Soviet educational policy and its implications for extensive data collecting, the author was forced to compromise his original intentions to utilize biographical sources quite freely.

## Nature of the research methodology

This study will combine the genetic and historical methods of research. As applied to this problem, the genetic method means the study of various stages of the development of Soviet educational policy, particularly that relating to mathematics education, for the purpose of discerning trends (changes and continuities) in this development over the 1917-1936 time period. The genetic method is more commonly referred to as the case study method, which is recognized as a common form of the inductive method in research. Hence, from the study of particular developments in mathematics education, general conclusions will be drawn with regard to change and continuity in Soviet educational policy in general. Such a method is readily combined with the historical method of research. This method, which will be directed at Soviet educational policy generally and at mathematics educational policy specifically, consists of: the formulation of hypotheses from the educational data collected; the criticism of the data and the modification (if necessary) of the hypotheses in accordance with all available evidence; the recommendation of factual truths, interpretations, and conclusions in writing.

Since Soviet data are sometimes a popular form of propaganda, one must treat them with utmost caution. Assertion is different from fact, and the researcher must distinguish between the two. Hence, criticism, as an integral part of the historical method, is important. There are two general types of criticism according to the research methodologist, Homer Hockett:[21] the first, external criticism, seeks to determine the trustworthiness of documents, and stresses the nature of the origins of such data; the second, internal criticism, is narrower in scope in that it seeks to appraise the meaning and trustworthiness of statements. Criticism seeks objectivity, and the dual processes of external and internal criticism, similar to a system of checks and balances, make this goal possible. For instance, two reference sources used in this study, the Pedagogical Encyclopedia /Pedagogicheskaia entsiklopediia, Vols. I-III (1927-1930) _7 and the Small Soviet

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[21] Homer C. Hockett, The Critical Method in Historical Research and Writing (New York: The Macmillan Co., 1955).

*Encyclopedia* [Malaia sovetskaia entsiklopediia, Vols. I-X (1930-1932)], are reliable as general sources of data. However, some statements with regard to educational policy and mathematics teaching are questionable, due to such considerations as: the nature of the given facet of educational policy itself; the competence of the writer as an authority on the topic; the motives of the writer; or their disagreement with comparable data from other reliable sources. In this research, as substantiated by certain footnotes, several instances were encountered when either the confusing nature of the data or the question of the reliability of such data merited cross-referencing or collation with other sources.

As a means to aid the organization of research data and to facilitate an understanding of the conduct of policy in a centralized educational system, the author devised the paradigm shown in Diagram I, which was used throughout the writing stage. The paradigm merely represents a conceptual framework, or a type of *systems analysis*,[22] which provides an overview of the various socio-educational parameters and policy-making decisions entering into the conduct of policy in a centralized educational system, such as found in the Soviet Union. It is an attempt to depict such definitional statements of educational policy, as those of Stanley Ballinger and Carter Good, respectively:

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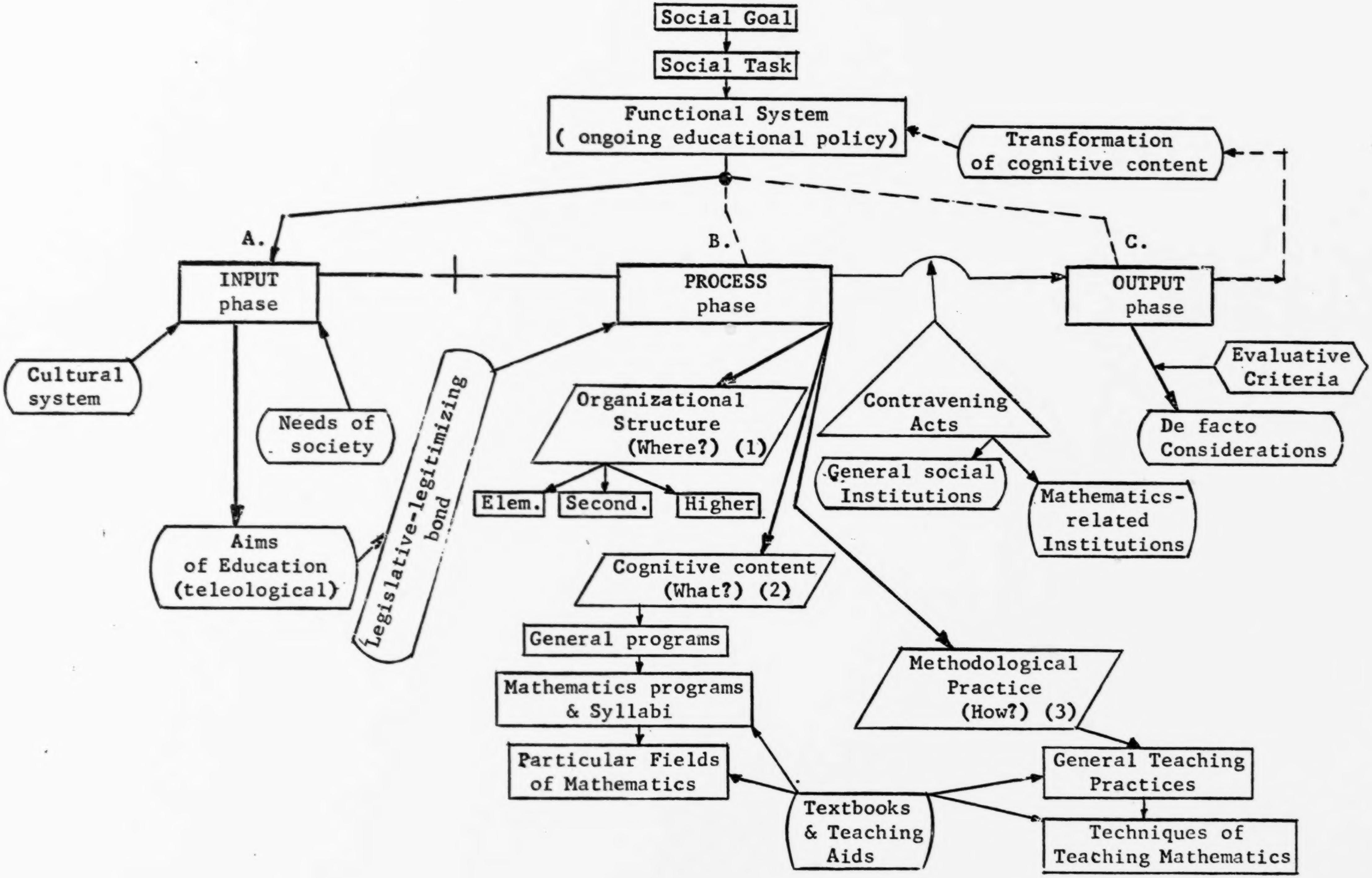
[22] For a more comprehensive treatment of systems analyses and their use in interdisciplinary social-scientific research, see:

Robert A. Solo, *Economic Organizations and Social Systems* (New York: The Bobbs-Merrill Company, Inc., 1967), especially pp. 357-376;

Harold G. Cassidy, "The University-Community System-Self-Regulated Bearer of Meaning," *Yearbook of the Society for General Systems Research*, Vol. XI (1966), ed. Anatol Rapoport and Ludwig von Bertalanffy (Ann Arbor: Society for General Systems Research, 1966), 133-141.

## DIAGRAM I

### PARADIGM ON THE CONDUCT OF POLICY IN A CENTRALIZED EDUCATIONAL SYSTEM
### (FOR A GIVEN CHRONOLOGICAL PERIOD)


Social Goal
Social Task
Functional System
( ongoing educational policy)
Transformation
of cognitive content
A.
B.
C.
INPUT
phase
PROCESS
phase
OUTPUT
phase
Cultural
system
Needs of
society
Aims
of Education
(teleological)
Legislative-legitimizing
bond
Organizational
Structure
(Where?) (1)
Elem.
Second.
Higher
Contravening
Acts
General social
Institutions
Mathematics-
related
Institutions
Evaluative
Criteria
De facto
Considerations
Cognitive content
(What?) (2)
General programs
Mathematics programs
& Syllabi
Particular Fields
of Mathematics
Methodological
Practice
(How?) (3)
General Teaching
Practices
Techniques of
Teaching Mathematics
Textbooks
& Teaching
Aids

> A basic function of educational policy is to enable, within a more of less stable institutional or similar situation, the experience of the past to be brought to bear normatively (regulatively) upon the problems of the institution within the developing present.[23]

> educational policy: a judgment, derived from some system of values and some assessment of situational factors, operating within institutionalized education as a general plan for guiding decisions regarding means of attaining desired educational objectives.[24]

It is not one of the objectives of this study to offer an elaborate treatise of "educational policy" as a general concept. It is necessary, however, to relate Diagram 1 to the nature of the research in the various chapters of this study. The INPUT phase suggests that the aims of Soviet education are the product of the interaction of three social phenomena: the cultural system inherited by the Soviet regime, the new philosophical-political orientation of Soviet society--namely, Marxism-Leninism--, and the economic needs of the society, particularly in accordance with the overriding objective of the rapid industrialization of a technically backward economy. Since the inherited cultural system includes the Imperial system of education, as already indicated, Chapter II will be devoted entirely to the system of education and educational policy in Imperial Russia. The other facet of the cultural system, the new philosophical-political doctrine of Marxism-Leninism, and the economic needs of the society will be analyzed in their relation to Soviet education and the formulation of educational policy in Chapter III. The feature, which principally distinguishes the formulation and the conduct of policy in a centralized system of education from those in decentralized systems, is the direct linking of educational aims emanating from the INPUT phase to the PROCESS phase of educational policy via legislative and legitimizing enactments by the centralized State apparatus. Such official enactments will be combined with the descriptive analyses of the three major components of the PROCESS phase--the organizational structure of the educational system (the "where"), the cognitive content of the instructional process ("what" is taught), and the methodological practice for transmitting the cognitive content of the instructional process ("how" the cognitive content is taught or learned)--according to three chronological periods. Each of these three periods, which roughly include 1917-1923, 1923-1928, and 1928-1936, will be treated in Chapters IV, V, and VI, respectively. Hence, the major emphasis of the research will be devoted to the INPUT and PROCESS phases of the conduct of educational policy during the 1917-1936 period. However, elements of the OUTPUT phase will be interjected whenever their introduction appears appropriate for the further interpretation of the behavior of Soviet educational policy. While the research will stress the importance of drawing conclusions, making interpretations, and attempting to ferret out factual truths or trends in accordance with the specific objectives all throughout the study, Chapter VII will highlight the more significant results uncovered.

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[23] Ballinger, loc. cit.

[24] Carter V. Good (ed.), Dictionary of Education (New York: McGraw-Hill Book Company, Inc., 1959), p. 193.

## Objectives of the study

The principal objectives of the study, in the order of their importance are as follows:

1) To analyze the development of Soviet educational policy, particularly in the context of mathematics education at the elementary and secondary levels of education, during the first two decades of the existence of the Soviet regime.

2) To explain the concepts of "change" and "continuity" in Soviet educational policy in relation to Imperial educational policy or to Imperial-type traditions in educational policy, particularly during the supposed abandonment of traditional norms in 1923-1931 in lieu of overwhelming experimentation in education. (Otherwise stated, is there evidence to suggest that the reversal in teaching generally, and in mathematics teaching specifically, officially endorsed in 1931-1932, was an ongoing "policy" already practiced by educators before such endorsement?)

3) To point up, wherever feasible, the dichotomy between the policy and practice of early Soviet education, especially when it contributes to an increased understanding of the viability of a given policy and the reasons for the same.

4) To shed light on certain non-specific objectives, of which increased knowledge is a paramount need today. Such non-specific objectives include:

    a. To contribute to our knowledge of social theory, with its implications for culture change. For example, to throw light on the relationship between Soviet educational policy and the concept of science as a modernizing tool, that is, is science really the "sacred cow"[25] to which both Soviet educational policy and political ideology--or for that matter, the educational policy and cultural goals of any industrializing society--are subservient?

b. To suggest to advocates (and opponents) of a national curriculum at various levels on the contemporary American scene in education some of the obstacles (and benefits) incumbent upon a national government to institute a centralized program of mathematics and/or science instruction.

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[25] Anthony Standen, Science Is a Sacred Cow (New York: Dutton, 1950), p. 1.

# CHAPTER II

# THE IMPERIAL HERITAGE IN EDUCATION

## Part I

## The General Education Structure

### Pre-Revolutionary elementary institutions

The official liberation of the serfs by the reforms of the early 1860's ushered in the beginning of modern educational policy in Russia, especially as regards the evolution of a system of mass education for an industrializing society. The democratization of society ostensibly meant the democratization of education. Accordingly, the decrees of Alexander II of June 18, 1863, July 14, 1864, and November 19, 1864 (respectively the Statute of the Universities, the Statute of the elementary schools, and the Statute of the Progymnasia and Gymnasia or secondary schools) were issued.[1]

Local district councils, known as zemstva, the central government, and private individuals all had the right of establishing elementary schools, which existed along with those of the Holy Synod, whose schools had been brought under the jurisdiction of the Ministry of Public Instruction. The organizational connection between the two parallel patterns of elementary education is indicated by the fact that the Director of Elementary Schools was an ex-officio member of the Church Council, with the result that "the influence is of the many over the one."[2] However, this dual pattern of elementary education remained both to characterize and to plague Imperial elementary education, undoubtedly because the tsarist government found some political security in reactionary Church policies.[3]

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[1] Nicholas A. Hans, History of Russian Educational Policy (1701-1917) (New York: Russell & Russell, Inc., 1964), p. 104.

A comparison of the two patterns of elementary education near the end of the nineteenth century and the pre-World War I period reveals a significant, secular trend:

TABLE 1

ADMINISTRATION OF ELEMENTARY SCHOOLS, 1898-1911[4]

| Controlling Agency | No. of Schools 1898 | No. of Schools 1911 | No. of Teachers 1898 | No. of Teachers 1911 | No. of Pupils 1898 | No. of Pupils 1911 |
|---|---|---|---|---|---|---|
| Min. Pub. Instruct. | 37,046 | 59,682 | 84,121 | 130,019 | 2,650,058 | 4,186,078 |
| Holy Synod | 40,028 | 37,922 | 67,907 | 66,525 | 1,476,124 | 1,793,429 |
| All others | 1,625 | 2,691 | 2,624 | 6,729 | 77,064 | 201,003 |
| Totals | 78,699 | 100,295 | 154,652 | 203,273 | 4,203,246 | 6,180,510 |

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[2] Beatrice King, *Changing Man* (New York: The Viking Press, 1937), p.14.

[3] In all the literature on Russian Imperial education (including both Soviet and non-Soviet sources), there appears to be undisputed acceptance of the characterization of the educational policies of the Holy Synod as "reactionary." Indicative of such assessments is that of S. Hessen and N.A. Hans in *Educational Policy in Soviet Russia* (London: P.S. King & Son, Ltd., 1930), pp. 8-9: . . .The lay system of the Ministry [of Public Instruction] was undenominational and was mainly in the hands of progressive local authorities - Zemstva and Municipalities. The Russian-Orthodox system of the Holy Synod was on the contrary strictly denominational and was subordinated to the clergy, *on the whole very conservative*. . . . This fact explains why all Russian political parties *with the sole exception of the extreme reactionaries* were against the system of the Holy Synod and advocated the unification of primary education under the Ministry of Public Instruction. (Italics mine.)

[4] William H. Johnson, *Russia's Educational Heritage* (Pittsburgh: Carnegie Press, 1950), p. 192, quoting figures for 1898 from Thomas Darlington, *Education in Russia* (London: His Majesty's Stationery Office, 1909), p. 190, based on official reports of the Ministry of Public Instruction; quoting figures for 1911 from D.B. Leary, *Education and Autocracy in Russia* (Buffalo: University of Buffalo, 1919), p. 122, based on *Statesman's Yearbook* for 1918.

Despite this accelerated growth of the non-clerical elementary schools, however, the elementary school generally did not deviate from the aim ascribed to it in the 1864 Statute, "to confirm among the people religious and moral ideas and to spread elementary useful knowledge."[5]

There are two reasons for emphasizing the development of the lay system of elementary education, as well as lay secondary and higher education, at the expense of Church schools in this study: first, the available information on the curricula of the parochial schools, especially in relation to mathematics, is rather inadequate; and second, if Hans' appraisal, that "in comparing the two competing systems, the preference must be given to the lay schools,"[6] is accepted, then the lay system of general education provides a better standard upon which to gauge Russian educational progress.

The reports submitted by the International Commission on the Teaching of Mathematics to the Fifth International Congress of Mathematicians, convened at Cambridge, England, in August, 1912, indicated notable changes too in the types of elementary schools directly under the Russian Ministry of Public Instruction. Three types of schools were then in existence in the public elementary pattern: the "ungraded elementary school" lasting three years, which was gradually being extended to four years, and into which pupils normally entered at age seven; the "five-year elementary school" with two classes of three and two years each, which also received pupils at age seven; and the

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[5] Hans, loc. cit.

[6] Ibid., p. 163.

"Municipal School" with a new four-year course, which was given to pupils arriving from the elementary school at ten or eleven years of age.[7] If the pupil did not enter the Municipal School from a lower level elementary school, he then completed all the classes (I-IV) in six years, since classes I and II were each two years in length. The Municipal School is synonymous with the designation "Urban School," and owed its existence to the transformation of the earlier "District School." The transformation of these District Schools into Urban (or Municipal) Schools came about during the 1872-1902 period, although German and certain other minorities retained the District School until 1915.[8] The District School originated with the Russian Statute of 1828, and like its successor, the pupils of its three-year course could not continue their education in the Gymnasium of the secondary level. However, during 1912-1915 all Municipal Schools (including the District Schools for minority groups) in turn were transformed into "Higher Elementary Schools" according to the decree of the third Duma of 25 June 1912.[9] This law added a year of instruction to the three-year course of the Municipal School, but more important was the fact that second-year pupils in the Higher Elementary School (in their fifth year of instruction overall), upon taking an examination in foreign languages, could transfer into the third year of all secondary schools.[10] Inasmuch as the curricula of the secondary schools, the Gymnasia, had a mathematical as well as a language bias, the acceptance of Higher Elementary School pupils into the secondary educational network speaks well for the probable quality of mathematics instruction at the upper elementary levels of schools under the Ministry of Public Instruction.

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[7] Isaac L. Kandel, The Training of Elementary School Teachers in Mathematics (Washington: Government Printing Office, 1915), p. 40, based on reports submitted by the International Commission on the Teaching of Mathematics to the Fifth International Congress of Mathematicians, August, 1912 (at Cambridge, England).

[8] Hans, op. cit., pp. 234-235.

[9] Ibid., p. 211.

While just a single teacher taught in the "ungraded" and "five-year" elementary schools, and in which the mathematical work was characterized as "necessarily simple,"[11] the Municipal School was marked by a relatively intensive mathematics program, as its curriculum, adopted in May 1872, suggests:

TABLE 2

MUNICIPAL SCHOOL CURRICULUM (1872)[12]
(NUMBER OF WEEKLY HOURS)

| Subjects | I class Two years | | II class Two years | | III class | IV class | Total |
|---|---|---|---|---|---|---|---|
| Religion | 6 | 6 | 3 | 3 | 2 | 2 | 22 |
| Russian & Slavonic | 8 | 8 | 6 | 6 | 5 | 4 | 37 |
| Arithmetics | 4 | 4 | 6 | 6 | 5 | 5 | 30 |
| Geometry & Drawing | - | - | 4 | 4 | 6 | 6 | 20 |
| History & Geography | - | - | 2 | 2 | 3 | 3 | 10 |
| Natural Science | - | - | 3 | 3 | 3 | 3 | 12 |
| Total | 18 | 18 | 24 | 24 | 24 | 24 | 131 |
| Singing & Gymnastics | 3 | 3 | 3 | 3 | 3 | 3 | 18 |

[10] *Ibid.*

[11] Kandel, *loc. cit.*

[12] Hans, *op. cit.*, p. 126.

While the 1912 program of the Municipal School included algebra to its course of study, it was, according to Kandel's information, "still organized on the basis of the regulations issued in 1877."[13] The total of 50 hours on mathematical subjects out of a possible 131 hours, or 38.2%, suggests the importance attached to mathematics in the best elementary educational institution at the time, the standard of which, in Hans' estimation, "was equivalent to the teaching in the first three years of secondard schools."[14] The precedent for this mathematics program was established by the curriculum of the District School as early as 1828, which too emphasized mathematics, as evidenced by the following table:

TABLE 3

DISTRICT SCHOOL CURRICULUM (1828)[15]
(NUMBER OF HOURS PER WEEK)

| Subjects | I Class | II Class | III Class | Total |
|---|---|---|---|---|
| Religion | 3 | 3 | 3 | 9 |
| Russian | 6 | 6 | 6 | 18 |
| Handwriting | 6 | 6 | 1.5 | 13.5 |
| Arithmetic | 6 | 6 | 1.5 | 13.5 |
| Geometry | 3 | 3 | 3 | 9 |
| Drawing | 3 | 3 | 4.5 | 10.5 |
| Geography | 3 | 3 | 3 | 9 |
| History | 3 | 3 | 3 | 9 |
|  | 30 | 30 | 30 | 90 |

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[13] _Ibid._ In Sh. I. Ganelin, _Ocherki po istorii srednei shkoly v rossii_/Essays on the History of the Secondary School in Russia_7 (Moscow: Gosudarstvennoe uchebno-pedagogicheskoe izdatel'stvo, 1954), pp. 144-145, the effect of the changes made in 1877 in the mathemathematics programs adopted in 1872 is minimized. According to Ganelin, "the reform of 1877 gave nothing new in principle." (P. 145) While his comments are aimed primarily at secondary education, there is no evidence to indicate the contrary at the elementary level of education.

[14] Hans, _loc. cit._

[15] Hans, _op. cit.,_ p. 69.

Mathematics instruction in the Municipal School, with its four classes and six years of total study, compared to that of the District School Curriculum above, became more comprehensive with the addition of algebra to that of arithmetic and geometry.[16] If in the District School curriculum, the total number of hours in mathematics are tallied, including the category of "drawing" with its normal inclusion of technical measurements, scales, geometrical figures and designs, the resultant percentage of 35.0 (31.5/90) falls below the corresponding computation of 38.2% (50/131) for the Municipal School, which succeeded it. Both the absolute and relative number of hours assigned to mathematics increased at the elementary level with the inception of the Municipal School in 1872. The urban Prussian primary school, in roughly comparable years of instruction, devoted only 21.6% of its hours to mathematics and drawing, a figure which shows the ambitious nature of the new Municipal School program.[17]

## Pre-Revolutionary secondary institutions--the general education structure

Administratively speaking, secondary education in Imperial Russia was distinguished from elementary education in the sense that the dichotomy between lay and clerical schools was relatively non-existent. While the elementary schools of the Holy Synod of the Russian Orthodox Church competed somewhat favorably in terms of numbers of teachers and pupil enrollments with the lay schools of the government and zemstva,[18] in the network of secondary education this dualism was much less pronounced. Reference to the organization of education institutions in Imperial Russia[19] does indicate the existence of Clerical Seminaries, which were secondary institutions having a six-year course of study approximating that of the Classical Gymnasia.[20] Furthermore, information contained in the reports of the Chief Procurator of the Holy Synod,[21] covering the period up to 1902, points out that Clerical Seminaries sent graduates on to secular universities so that by the end of the reign of Alexander II (1855-1881) they constituted 23.4% (approximately 2,150 students) of the university enrollment. Such involvement was due to Count Tolstoi, Minister of Public Instruction (1866-1880), who arrested the declining position of these Seminaries with the transfer of huge sums of government funds for their support in recognition of their importance in aiding reactionary policies of the government. However, while some graduates of the Clerical Seminaries did gain entrance into the university by taking examinations, many received a higher education in the four-year Clerical Academy, and the majority of them entered directly into elementary school teaching or served as assistants to the clergy.[22] This was particularly true after Tolstoi's term of office, since from that time forward, the influence of the Clerical Seminaries steadily diminished. This relative insignificance of clerical secondary institutions facilitated a greater control by the Ministry of Public Instruction than existed at the elementary level, wherein the sole administrative connection between lay institutions, under the jurisdiction of the Ministry of Public Instruction, and clerical institutions was the appointment of a director for the former, who was also a member of the Council of the Holy Synod, as already indicated.[23] It appears that such continuous control over secondary education by the government would effect qualitative differences in the implementation of mathematics programs relative to those of the divided network of elementary schools.

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[16] Supra p. 33. (Table 2 containing Municipal School curriculum).

[17] F. Eby, The Development of Modern Education (2d ed.; Englewood Cliffs: Prentice-Hall, Inc., 1952), p. 534.

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[18] *Supra* p. 30. (Table 1 on Administration of Elementary Schools).

[19] For a graphical scheme of public education in Imperial Russia, see "Soiuz sovetskikh sotsialisticheskikh respublik" ["Union of Soviet Socialist Republics"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II, 387.

[20] "Dukhovnye seminarii" ["Clerical Seminaries"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I, 362.

[21] *Vsepoddanneishie otchety ober-prokurora Sviateishago Sinoda* [Aggregate Reports of the Chief Procurator of the Holy Synod], 1902.

[22] "Dukhovnye seminarii," *loc. cit*.

The Statute of the Progymnasia and Gymnasia of November 19, 1864, dealt with the Progymnasia of all Ministries, but only with the Gymnasia for boys under the Ministry of Public Instruction.[24] The aim of the Gymnasia, according to Clause 1 of the Statute, was "to furnish the coming generation with a general education and at the same time to prepare the pupils for the universities."[25] It divided the Progymnasia and Gymnasia into classical and real (modern) types, with the Progymnasia making up the first four years of the seven-year Gymnasia--the three senior classes preferably being in a separate building.[26] A further distinction divided the Classical Gymnasia into two forms--Gymnasia with Greek and Latin and those with just a Latin language bias, while a modern scientific bias distinguished the Real Gymnasia. Private secondary schools were permitted, although Clause 53 directed the government to appoint their directors and required their curricula to be similar to those of its own schools.[27]

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[23] Supra p. 29.

[24] Hans, op. cit., p. 105.

[25] Ibid.

[26] "Progimnaziia" ["Progymnasium"], Pedagogicheskii slovar' [Pedagogical Dictionary], Vol. II, 183. Progymnasia came into existence in accordance with the Statute of 1864.

The following table conveys the academic emphases of the different types of secondary educational institutions in 1864:

TABLE 4

CURRICULA OF GYMNASIA IN 1864[28]
(NUMBER OF WEEKLY LESSONS /EVERY LESSON = 1 1/4 HOURS_7 )

| Classes | I | | | II | | | III | | | IV | | | V | | | VI | | | VII | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subjects | G | L | R | G | L | R | G | L | R | G | L | R | G | L | R | G | L | R | G | L | R | G | L | R |
| Religion | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 14 | 14 | 14 |
| Russian | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 24 | 24 | 25 |
| Latin | 4 | 4 | - | 5 | 5 | - | 5 | 6 | - | 5 | 6 | - | 5 | 6 | - | 5 | 6 | - | 5 | 6 | - | 34 | 39 | - |
| Greek | - | - | - | - | - | - | 3 | - | - | 3 | - | - | 6 | - | - | 6 | - | - | 6 | - | - | 24 | - | - |
| French | 3 | - | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 4 | 3 | 19 | 19 | 22 |
| German | | 3 | 3 | | 2 | 3 | | 2 | 3 | | 2 | 3 | | 3 | 4 | | 3 | 4 | | 4 | 4 | | 19 | 24 |
| Mathematics | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 3 | 22 | 22 | 25 |
| History | - | - | - | - | - | - | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 14 | 14 | 14 |
| Geography | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | - | 8 | 8 | 8 |
| Nat. Science | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | - | - | 3 | - | - | 3 | - | - | 4 | - | - | 4 | 6 | 6 | 23 |
| Physics | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 6 | 6 | 9 |
| Handwriting & Drawing | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 2 | 2 | 2 | - | - | 2 | - | - | 2 | - | - | 2 | 13 | 13 | 20 |
| | | 24 | | | 25 | | | 27 | | | 27 | | | 27 | | | 27 | | | 27 | | | 184 =<br>230 Hrs. | |

G = Gymnasia with Greek and Latin } Classical Gynmasia
L = Gymnasia with Latin }
R = Gymnasia with Modern Bias (Real)

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[27] Hans, loc. cit.

[28] Ibid, p. 105-106.

With the exception of languages, mathematics enjoyed the leading percentage of the curricula of all three forms of Gymnasia. Interestingly enough, the Real Gymnasia apportioned only 1.6% more of its curriculum to mathematics than did the Classical types (13.6% to 12.0%, respectively), and in the VI and VII classes, which for the Classical Gymnasia led directly into the university, the time appropriated for it by the latter even exceeded that of the former. Their curricula differ primarily in the substitution of additional lessons in natural science and drawing in the Real Gymnasia in place of Greek and/or Latin in the Classical types. It is evident that all three types of Gymnasia imparted a general education.

Unlike numerous earlier attempts to establish a ladder system of schooling,[30] which would be common to all youth, the new law contained discrepancies in the privileges extended to secondary school people, depending on the type of Gymnasium attended. The most outstanding of these was that pupils of the Real Gymnasia were ineligible for matriculation at the universities--being restricted to certain special higher institutions.[31] This bifurcation was not only confined to Real Gymnasia and universities, but also existed between elementary and secondary levels of education, as evidenced by the fact that the

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[29] Comparing the Russian classical gymnasium with the German, which had served as a model for Russian education, one finds that it accorded but 1.3% less time to mathematics than did its German counterpart. Cf. F. Eby, op. cit., p. 537.

[30] The Projects of educational reforms of 1860 and 1862, headed by N.I. Pirogov, were the most recent and obvious of these attempts.

[31] Adolphe E. Meyer, An Educational History of the Western World (New York: McGraw-Hill Book Co., 1965), p. 330.

District and Municipal elementary schools did not prepare pupils directly for secondary education.

The question arises then, what means were available for preparing pupils for secondary education? Private institutions and tutors provided one source, but preparatory classes, which the Classical Gymnasia maintained themselves, enjoyed widespread popularity.[32] This system, however, underwent a drastic change when the reform of 9 June 1888 resulted in the closing of these special classes while simultaneously raising the standards of the entrance examination of these Gymnasia.[33] This step completely abrogated any preparatory responsibilities of the elementary school. With respect to the Real Gymnasia, frequently referred to as "Real Schools," the breach between elementary and secondary institutions was made complete by the reverse process. Prior to this reform, these institutions had no preparatory classes--thereby enabling some pupils of elementary schools to enter them.[34] The reform, however, having established preparatory classes under the Real Schools, made it mandatory that only pupils of these classes fill all vacancies[35]--thereby negating any link whatsoever with the common elementary school. This measure adversely affected the prospects of any democratization of secondary education and quickly dispelled any hopes for establishing a genuine ladder system of education.

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[32] These preparatory classes, generally a year in duration, were established by the Statute for Classical Secondary Schools of July 31, 1871. Hans, op. cit., p. 117.

[33] Hans, op. cit., p. 149.

[34] Ibid., p. 150.

[35] Ibid.

Due in part to the frequent turnover of Ministers of Public Instruction during 1897-1917,[36] little progress was accomplished in secondary educational reform until the Soviet period, except during the short term of office of Count P. N. Ignatiev (1915-1916). Ignatiev was responsible for the drafting of a new project in 1915. The "Ignatiev Plan," which reformed the curricula of the Gymnasia, began to be implemented in 1916.[37] According to it, all secondary schools were divided into two levels or grades: the first level, which had a three-year course; the second level, whose four classes encompassed three departments--classical, modern humanities, and real (modern).[38] The first level, which was distinguished from the former Progymnasia by a curriculum common to all types of secondary institutions, formed a direct extension of the "Higher Elementary Schools."[39] The "classical," "modern humanities," and "real" departments bore a close resemblance to the former schools of Greek and Latin, Latin, and Real Gymnasia, respectively, having shared common academic biases. The revised curricula of the Ignatiev Plan are described in tabular form below:

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[36] Infra, p.364 in Appendix I (Chronology of Ministers of Public Instruction, 1802-1917).

[37] Johnson, op. cit., p. 194.

[38] Hans, op. cit., p. 209.

[39] Supra, pp. 32-33, (for a discussion of the "Higher Elementary School" /formerly, the "Municipal School"/.

TABLE 5

SECONDARY SCHOOL CURRICULA UNDER THE IGNATIEV PLAN (1916)[40]
(TOTAL STUDY HOURS PER LEVEL PER WEEK ACCORDING TO TYPE OF SCHOOL)

| Types of secondary institutions / Subjects | 1st Level (Classes I-III) | 2nd Level (Classes IV-VII) | | |
|---|---|---|---|---|
| | All types Secondary Schools | Classical | Modern Humanities | Real |
| Religion | 6 | 8 | 8 | 8 |
| Russian language | 18 | 16 | 19 | 16 |
| History | 6 | 12 | 14 | 11 |
| Mathematics | 12 | 12 | 14 | 17 (22)* |
| Physics & cosmography | | 9 | 11 | 15 |
| Chemistry | | | | 2 |
| Logic | | 2 | 2 | 2 |
| Modern languages | | 15 | 18 | 13 |
| Geography | 7 | 4 | 6 | 6 |
| Natural Science | 6 | | 2 | 9 (2) |
| Ancient languages | | 23 | | |
| Drawing | 7 | | | |
| Singing | 3 | | | |
| Practical work in laboratories | 3 | | | |
| Physical exercise | 9 | | | |
| Total for levels | 77 | 101 | 94 | 99 (97) |

*Hours in parentheses ( ) refer to study hours for math majors only.

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[40] Figures for 2nd Level compiled from data in Johnson, op. cit., p. 294; figures for 1st Level compiled from Hans, loc. cit.

Despite the continued curricular differences existing amongst the various secondary institutions right up to the eve of the Bolshevik Revolution in 1917, the Plan of Ignatiev was the crowning of a tendency originating in the 1870's at the lower level of Imperial secondary education. This tendency was a gradual lessening of the demarcation between the mathematics curricula of the Classical and Real Gymnasia. With the adoption of a common curriculum for classes I-III of all secondary schools, the curricular differences at the lower secondary level would be eliminated in toto with respect to the amount of instruction in mathematics.

Through a comparison of the mathematics curricula of pre-Revolutionary institutions at certain focal stages in the development of secondary education, as is done below, tendencies in educational policy become readily discernible.

TABLE 6

COMPARISON OF MATHEMATICS CURRICULA OF PRE-REVOLUTIONARY SECONDARY SCHOOLS BY CLASS GROUPS[41]
(NUMBER OF HOURS PER WEEK)

| Types of Secondary Institutions | G /[C]lassical_7 | | | | | | L /[M]odern Humanities_7 | | | | | | R /[R]eal_7 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Class Groups | I-III | | IV-VII | | I-VII | | I-III | | IV-VII | | I-VII | | I-III | | IV-VII | | I-VII | |
| Math Curricula / Years | Math hrs. / Total | % | Math hrs. / Total | % | Math hrs. / Total | % | Math hrs. / Total | % | Math hrs. / Total | % | Math hrs. / Total | % | Math hrs. / Total | % | Math hrs. / Total | % | Math hrs. / Total | % |
| 1864 | 11.3 / 95 | 11.9 | 16.2 / 125 | 12.0 | 27.5 / 230 | 12.0 | 11.3 / 95 | 11.9 | 16.2 / 135 | 12.0 | 27.5 / 230 | 12.0 | 13.8 / 95 | 14.5 | 17.5 / 135 | 13.0 | 31.3 / 230 | 13.6 |
| 1872 | 12 / 74 | 16.2 | 19 / 132 | 14.4 | 31 / 206 | 15.0 | 12 / 74 | 16.2 | 19 / 132 | 14.4 | 31 / 206 | 15.0 | 12 / 77 | 15.6 | 19 / 124 | 15.3 | 31 / 201 | 15.4 |
| /[1]916_7 | 12 / 77 | 15.6 | 12 / 101 | 11.9 | 24 / 178 | 13.5 | 12 / 77 | 15.6 | 14 / 94 | 14.9 | 26 / 171 | 15.2 | 12 / 77 | 15.6 | 17 / 99<br>*(22) / (97) | 17.2<br>(22.7) | 29 / 176<br>(34) / (174) | 16.5<br>(19.5) |

*( ) - Curriculum for math majors only /[1]915_7

[41] Figures for 1864 compiled from data in Table 4 (p. ); figures for 1872 for Classical Gymnasia (G & L) compiled from Hans, op. cit., p. 118, and for Real Gymnasia from Ibid., p. 121; figures for /[1]916_7 compiled from data Table 5 (p. ).

Types of Secondary Institutions 1864 & 1872 —
(G = Gymnasia with Greek and Latin) Classical Gymnasia — /[C]lassical_7
(L = Gymnasia with Latin) — /Modern Humanities_7
(R = Gymnasia with Real Bias (Modern) — /[R]eal_7
} Types of Secondary Institutions /[1]915_7

The identification of the dates 1864 and 1916, as key transition periods in the development of Gymnasia curricula, becomes obvious from the preceding discussion of the Statute of the Progymnasia and Gymnasia, and the Ignatiev Plan, respectively. The rationale for the additional selection of 1872 as high significant is predicated not so much on the fact that the Classical and Real Gymnasia received new statutes on reform in 1871 and 1872, respectively, but rather, because by the Statute of 1871, the Russian Gymnasia received State programs, which were compulsory for all, for the first time.[42] Ganelin asserts:

> Prior to this time there were no compulsory programs. The school worked on the basis of program-instructional materials, which were worked out chiefly in places attached to educational districts. That which existed, the "Instruction relative to the volume of teaching educational subjects in gymnasia and progymnasia," bore a highly general and schematic character.[43]

Ganelin, as do most critics of Tolstoi (Minister of Public Instruction, 1866-1880), attributes the introduction of such compulsory programs to the latter's reactionary fear of students receiving some kind of "seditious material."[44] Despite the admonitions by the authors of the new programs that "the educational programs worked out were not supposed to hamper the free and wholesome work of each teacher,"[45] Tolstoi insisted that teachers must keep to the programs "as exactly as possible,"

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[42] Ganelin, loc. cit.

[43] Ibid.

[44] Ibid.

[45] Sbornik rasporiazhenii i postanovlenii po gimnaziiam i progimnaziiam /Collection of Instructions and Decrees on Gymnasia and Progymnasia_7, (1874), p. 162, cited by Ganelin, ibid.

"to adhere strictly to the designated limits."[46] These programs represent, in the opinion of this writer, the first actual attempt of a Russian government to go beyond the previous policy of establishing different types of educational institutions and curricula for achieving given educational goals, and to dictate precisely what material was to be taught. Such action served to stimulate activity related to the working out of methodological literature and to the relative proliferation of mathematics textbooks and manuals in the 1870's and 1880's, which will be treated later on.[47]

It is noted in Table 6, above, that the percentages of time allocated to mathematics for First Level classes I-III are identical for the Greek/Classical and Latin/Modern Humanities Gymnasia for all three years examined. Comparing these percentages with those corresponding to classes I-III of the Real secondary schools (11.9% to 14.5%, 16.2% to 15.6%, and 15.6% to 15.6%, respectively, for 1864, 1872, and /1916/, one detects that the percentage differential diminishes gradually--to the extent that it is non-existent in 1916. Thus, by 1916, although academic biases are preserved along lines similar to those existing in nineteenth-century secondary educational institutions, mathematics in the First Level (classes I-III) receives equal emphasis in all secondary institutions. This was one main result of the new ministerial policy on programs.

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[46] Ibid.

[47] Infra, p. 193 et seq.

The Second Level (classes IV-VII) of secondary institutions presents a different picture from that of the First Level. Table 6 indicates that in the Greek/Classical curricula the number of hours appropriated to mathematics in 1864 and 1916 is nearly the same (12.0% to 11.9%, respectively). In the Latin/Modern Humanities types there is a noticeable emphasis on mathematics up through the 1870's (from 12.0% to 14.4% in 1872), as in the Greek/Classical types for the same period. The former tend to taper off, however, after that point to 1916 (14.4% to 14.9%, respectively). The ascent of mathematics hours in the curricula of the Real schools, unlike the trend in the other types, is rather sharp and constant (13.0% in 1864, 15.3% in 1872, and 17.2% in 1916).

What do such statistical data indicate? They illustrate the antecedents of an historical pedagogical controversy, which was later to characterize Soviet upper secondary and higher education. This controversy became, in philosophical terms, the oscillation between "classicism" and "realism" at these levels.

Classicism, as related to pedagogy, implied a general education bias based on literary humanistic criteria, whereas realism most often carried the connotation of a utilitarian emphasis based on scientific knowledge.[48] From a political-educational standpoint, classicism cannot be associated exclusively with conservative tendencies, nor can realism be related only to liberal or progressive principles. Hans convincingly suggests that, "it was Nicholas I (1825-1855), the impersonation of the reaction, who abolished the classical bias and instituted the first 'real' schools,"[49] which heavily favored mathematics and scientific instruction--a considerably liberal gesture in the context of Russian culture at that time. Conversely, the years in office of Count D. Tolstoi, Minister of Public Instruction (1866-1880), which come within the "period of the great reforms" (1855-1894), saw the adoption of the 1871 Statute for Classical Gymnasia, just discussed in relation to the introduction of the first compulsory State programs, which Johnson labels as "sabotage of the 1864 reforms."[50] However, Hans points out that, according to this Statute, "not only the hours, devoted to classical subjects, were augmented, but also those of mathematics. . ."[51] Paradoxical to its more utilitarian purpose in the Real schools, mathematics, while being philosophically unassociated with classical subjects, is here associated with a policy of classicism by virtue of its place in the augmentation of general educational subjects.[52] The conflict between classicism and realism was thus quelled to some extent.

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[48] The divergent views of Robert M. Hutchins and Alfred N. Whitehead best describe the philosophical traditions of "classicism" and "realism," respectively, as the epistemological bases of opposing philosophies of education:

In defense of a *classical or general education*, which includes the study of mathematics, Hutchins suggests:

> . . . the primary object of institutions. . . will be the cultivation of the intellectual virtues, I suggest that *the cultivation of the intellectual virtues* can be accomplished through the communication of our intellectual tradition and through training in the intellectual disciplines. . . . It means a grasp of the disciplines of grammar, rhetoric, logic, and *mathematics*; reading, writing, and figuring. . . . This program of *general education* is one to which all students, when they have learned to read, should be exposed. (Italics mine.) Robert M. Hutchins, *Education for Freedom* (Baton Rouge: Louisiana State University Press, 1944), p. 60.

For a more comprehensive account of Hutchins' views, stressing the advantages of a general, theoretical preparation in the liberal arts, see R. M. Hutchins, *The Higher Learning in America* (London: Oxford University Press, 1936).

In defense of an emphasis on *realism in education, stressing the applied aspects of knowledge obtained in the pedagogical process*, Whitehead claims:

> Education with inert ideas is not only useless: it is, above all things, harmful - *Corruptio optimi, pessima*. . . . Education is the acquisition of the art of the utilization of knowledge. . . . There is only one subject-matter for education, and that is Life in all its manifestations. Instead of this single unity, we offer children - Algebra, from which nothing follows; Geometry - from which nothing follows; Science, from which nothing follows. (pp. 13-18.)
> . . . We shall ruin mathematical education if we use it merely to impress general truths. The general ideas are the means of connecting particular results. After all, it is the concrete special cases which are important. . . . In order to obtain the full realization of truths as applying and not as empty formulae, there is no alternative to technical education. . . . *Your ideas gain that reality which comes from seeing the limits of their application*. (Italics mine, p. 63.) Alfred N. Whitehead, The Aims of Education (New York: The Macmillan Co., 1955).

These examples serve to point up a certain flexibility of mathematics--or for that matter, of all the exact sciences. That is, educators may identify mathematics with either general theoretical or "pure" educational subject matter, or with technical, utilitarian subject matter, which we may term "applied" knowledge. The alternatives for identifying the nature of mathematics in the curriculum of any educational institution are determined primarily by the objectives and methods of the given institution, but even this qualification is modified by such factors as compulsory State programs, differing practices of teachers, and the end purpose behind a specific mathematics preparation.

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[49] Hans, op. cit., p. 114.

[50] Johnson, op. cit., p. 150.

[51] Hans, op. cit., p. 118.

[52] There is this one historical association between mathematics and the "classical" education: it was always a part of the seven liberal arts, and accordingly, was part of the "general education" advocated by humanists-classicists, such as Hutchins.

Hence, by extending the philosophical concepts of "classicism" and "realism" to their pedagogical implications--namely, general educational and utilitarian training, respectively--the vacillation of mathematics instruction between the two is seen as a characteristic of Imperial educational policy. Although such interchanging of the type of knowledge, either "pure" or "applied," which was emphasized in mathematics instruction, tended to conform with the appropriate educational structure--general educational and technical/vocational, respectively--this pattern did not emerge in every case. For instance, teacher training institutions, while organizationally associated with the technical/vocational structure, were not confined to disseminating only utilitarian aspects of mathematics in Imperial Russia, nor could their functions be so interpreted at any time up to the present. It would be similarly improper to attribute to mathematics curricula in Classical Gymnasia an exclusively "pure" educational intent. The historian of education can only generalize to the extent that institutions of the general education structure exhibit a propensity toward general and theoretical, or "pure," knowledge in their instruction, while those of the technical/vocational structure are inclined to be more utilitarian with regard to the aims and techniques of instruction. This dualism, especially as it relates to the teaching of mathematics, appears to be a universal feature. The writer places special emphasis on this feature, however, because for Soviet Russia the dichotomy between the two pedagogical attitudes became, as we shall see, much more pronounced than has been the case in other industrializing societies. That this dualism took root already in the Imperial Russian system of education is evidenced in the curricula of the various Gymnasia, and this fact has historical and comparative significance.

According to the figures in Table 6 for Real secondary institutions, with the inception of the Ignatiev Plan in 1916, one notes a markedly increasing emphasis on the place of mathematics in the curricula for classes IV-VII. This, of course, was a result of the establishment of a second track, exclusively for mathematics majors, in the curricula of the Second Level. While the origins of such a scheme date back as far as Peter the Great's School of Mathematics and Navigation Sciences (founded in 1701), this was the only secondary institution of note after that time to have as its main objective a special preparation of pupils in mathematics. It went well beyond the usual emphasis on mathematics and natural scientific disciplines of the Real Gymnasia. From Table 5 we note that the track for mathematics majors dispenses with seven of the nine hours devoted to natural science in the general track in the Real curricula, while supplementing the latter with five additional hours of mathematics (thereby accounting for the two hours less of weekly instruction relative to the total for the general track).

Equally noteworthy is the fact that physics remained untouched, which reflects a keen regard by Russian educators for an affinity between physics and mathematics in the educational process. The existence of physico-mathematical faculties in Imperial universities, as well as attempts at the turn of the twentieth century to allow Real school pupils the right to enter such faculties,[53] further attest to this pedagogical inclination.

The uniqueness of this special track lies in its attempt to resolve the "classicism-realism" dilemma by stressing general, theoretical, comprehensive preparation--the pedagogical manifestation of classicism, in a particular academic specialty, that of mathematics, which represents an area of knowledge with utilitarian potential--the pedagogical goal implied by realism.

Would this policy concept of broad, comprehensive preparation in a particular specialty become more universal in the upper grades of Soviet secondary education, or at least in the preparation of prospective mathematicians? Would Soviet educational objectives, defined by the new philosophical dogma of Marxism-Leninism, be served by embracing a policy designed to bring about a rapprochement of the philosophies of classicism and realism? Or was the introduction of the track concept into the 1916 Real secondary institutions simply an Imperial innovation destined to end with the old regime itself in 1917? These are only a few of the questions for subsequent discussion suggested by the curricular data of Tables 5 and 6.

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[53] N. P. Bogolepov, Minister of Public Instruction (1898-1901), in 1900 proposed in his own reform project to give Real School pupils the right to enter medical and physico-mathematical faculties of universities, but his assassination arrested its possible adoption. (See Hans, op. cit., p. 178.)

## Pre-Revolutionary higher educational institutions--the general education Structure

A distinctive feature of Imperial education was, we have observed, its separation into two major areas or kinds of learning: the area of general, theoretical preparation and the area of practical, utilitarian preparation. Whereas educational institutions at all levels in Imperial Russia can be categorized generally as providing either one of these types of preparation, this is not to imply that the disciplines instructed therein are developed exclusively from a theoretical or a utilitarian pedagogical basis. The facility of mathematics instruction to accommodate both areas of learning, either in the form of "pure" mathematics for general preparation, or in the form of "applied" mathematics for utilitarian and specialized preparation, was not limited to secondary education, but was evidenced in higher education also. Unlike secondary education, however, wherein theoretical and practical preparation in mathematics were prevailing, yet not exclusive, attributes of institutions of the general education and technical/vocational structures, respectively,[54] the dichotomy between theoretical and practical preparation in higher educational institutions was sharply drawn along general education and technical/vocational structure lines, respectively. That is, excluding the few Pedagogical Institutes of the technical/vocational structure, theoretical preparation in "pure" mathematics was carried out only in the universities of the general educational structure, while a utilitarian preparation in applied mathematics was reserved for higher technical institutions.

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[54] Consider, for example, that up to 1915 the graduates of Real Gymnasis (of the general education structure) were permitted to continue their education only in higher technical institutions, the preparation for which required a certain level of proficiency in applied mathematics. Conversely, Teachers Institutes, which (as secondary institutions within the technical/vocational structure of education) will be described later in more detail, required a general preparation in the basic fundamentals of mathematics for its graduates, who taught in the upper elementary grades of the general education structure.

Upon what basis, however, can the higher pedagogical institutions of the technical/vocational structure, namely, many of the Pedagogical Courses and Pedagogical Institutes with a rapidly mounting growth after the turn of the twentieth century, be exempted from this comparison? Analogous to pedagogical institutions at the secondary level, such higher pedagogical institutions undertook instruction in both the general and utilitarian sense (i.e., theoretical preparation in mathematics was only to be a prelude to "pedagogical practice" in the classroom). The precedent for this phenomenon, this exception to a clear policy of dichotomy in higher education, originated in the Main Pedagogical Institute.

This Institute, re-established in 1828 by Imperial decree, was academically guided by the same three faculties as in 1816--namely, the faculties of, (1) Philosophical and Juridical Sciences, (2) Mathematical and Physical Sciences, and (3) Historical and Literary Sciences.[55] As will later be observed,[56] the same types of faculties, in addition to the Medical Faculty, came to exist in Moscow University and in other universities by the 1850's and 1860's. The influence of the Main Pedagogical Institute on the universities, however, stems from more than just the similarity of their faculty organizations. Both the presence and absence of the former's activity in pedagogy affected the work of the university in the preparation of secondary teachers in two principal respects: first, following the establishment of a special Chair of Pedagogy[57] in the Main Pedagogical Institute in 1840, its success in the area of pedagogy, particularly before the reduction of its course from six to four years in 1847, up to which time the sixth year was devoted solely to the study of pedagogy,[58] resulted in almost all Russian universities taking the cue a decade later to establish their own such chairs[59]--hence, what few professional and methodology courses in pedagogy did exist in Imperial Russian universities since the middle of the nineteenth century were due to the influence of the Main Pedagogical Institute;[60] second, the paradox shared by the centralized Imperial and Soviet education systems in that the preparation of secondary teachers has developed not only within both their general education and technical/vocational structures, that is, within the universities and higher Pedagogical Institutes, respectively, but also, for the upper secondary classes, was assumed mostly by the universities, particularly since the closing of the Main Pedagogical Institute in 1858 and other Pedagogical Institutes, which had been attached to universities, in 1859.

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[55] Johnson, op. cit., p. 127.

[56] Infra pp. 59-60.

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[57] With the establishment of the special Chair of Pedagogy, a single professor was assigned to teach all subjects in that area. Johnson, op. cit., p. 130.

[58] This abandonment of pedagogy in the curriculum, along with a further curtailment of the course from four to two years in 1849, resulted in a movement toward greater specialization in the Main Pedagogical Institute. This became especially pronounced when, in the early 1850's, the Physico-Mathematical Faculty was divided into two departments--mathematical sciences and natural sciences. Ibid., p. 132.

[59] Ibid., p. 105. Dorpat University was the sole exception to such a policy.

[60] Notwithstanding such earnest, yet nominal, early attempts to raise the prestige of pedagogy as a discipline of broad educational value, which also has implications for the teaching of specific disciplines, the efforts of individual pedagogues-methodologists, as will subsequently be shown, accounted for most achievements in pedagogy in general, and methods of teaching mathematics in particular.

The ultimate demise of the Main Pedagogical Institute and the similar Pedagogical Institutes was understood by observers to be the last representative of such a higher education exception to a clear policy of general-professional dichotomy. The establishment of special Pedagogical Institutes and Pedagogical Courses, however, mainly after the turn of the present century, was renewed recognition of the need for bridging this dichotomy in the area of teacher training.

This "middle-of-the-road" tendency of pedagogical institutions, particularly at the higher educational levels, contrasted not only with the remaining types of higher educational institutions in Imperial Russia, which were categorically divided according to the type of preparation offered, but also with Western European higher educational institutions. That is, the dichotomy in higher education between institutions providing a general, theoretical education and those providing a utilitarian one was typical of European educational philosophy generally.[61] The pattern of similarity here between higher educational institutions (excluding those of the special pedagogical type in both cultures) of Western Europe and Imperial Russia is reminiscent of the impact of French and German influence on Imperial Russia, especially in the training of an "intellectual intelligentsia" on the one hand, and a "technical/skilled," or "working intelligentsia," on the other.

The dichotomy becomes more vivid by contrasting it with American higher educational policy. The professional schools in the United States, such as the schools of engineering, medicine, dentistry, and law, have been integrated within the university structure, although retaining much autonomy in their own academic policies, in an attempt to reduce this dichotomy between general and professional-utilitarian preparation. This practice stands in stark contrast to European and Imperial Russian higher education. With regard to the preparation of teachers, not only is the need for both theoretical and practical preparation stressed, as was the policy in Western Europe and Imperial Russia, but also this dichotomy is excepted in a more overt manner with the gradual transformation and elevation of Normal Schools to university status. Professional training in the United States, as such, is not normally distinguished from university training in the classical usage of the term, and in this sense, except for pedagogical institutions, it stands in contradistinction to the Imperial Russian, as well as the Western European, system of education.

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[61] For a rather comprehensive treatment of the conflicts, "the old and new dimensions of thought," associated with the dual network of higher educational institutions in Western Europe at this time, particularly with regard to the roles of science and religion in higher education, see Chapter 13 ("Intellectual Foundations of Modern European Education," especially pp. 419-424) in R. F. Butts, A Cultural History of Western Education (New York: McGraw-Hill Book Company, Inc., 1955).

Thus, a dichotomy between general, theoretical preparation and technical, utilitarian preparation characterized higher education in Imperial Russia. Many of the higher technical institutes in Imperial Russia were simply departments of universities, which would seem to facilitate their incorporation into the university structure. These institutes offered applied, professional training in one of several specialized areas, such as agriculture, medicine, engineering and certain of the social sciences. Not only would this dichotomy in higher education continue to persist in Soviet Russia, but also, its impact on the preparation of secondary school graduates in the late 1920's and early 1930's when, according to DeWitt, "theoretical knowledge and applied knowledge were viewed as distinct educational objectives,"[63] would loom large.

As already indicated, the preparation of secondary teachers, especially for the senior secondary classes (IV-VII), took place primarily in the universities. This was unavoidably the case after the dissolution of the Main Pedagogical Institute. More specifically, the teaching of mathematics in Imperial and Soviet universities, whether it be for the purpose of preparing mathematicians or mathematics teachers for upper secondary and higher educational institutions, has always been concentrated in the physico-mathematical faculties of the universities. Such a monopoly by the universities in the preparation

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[62] DeWitt, op. cit., p. 210.

of mathematics teachers, therefore, necessitates an investigation of certain organizational aspects and general characteristics of the development of physico-mathematical faculties at critical periods in the overall development of the university in Imperial Russia. These periods conveniently correspond to the dates in which new statutes governing the university were issued by the Imperial government.

The Statute of July, 1835, had divided studies among three faculties in accordance with the West European practice: (1) Philosophy, (2) Law, and (3) Medicine.[63] The Philosophy Faculty comprised the departments of the humanities and the sciences, the former including nine chairs and the latter eight.[64]

On June 18, 1863, Alexander II (1855-1881) issued the Statute of the Universities, which extended to University Councils a variety of new privileges, including:

> . . . the right to decide all program-methods problems, to distribute the means for educational supplies by faculties, to retain the best graduates of the university for preparation toward a professorial title, to publish works of the university, to award medals and stipends to students, and similarly prizes for scientific works.[65]

The new Statute specified what departments[66] were to be under each of the faculties, which by then numbered four: the historico-philological, the physico-mathematical, the juridical, and the medical. As the ten departments of the physico-mathematical faculty, it stipulated: pure mathematics (chistaia matematika); mechanics; astronomy and geodesy; physics and physical geography; chemistry; mineralogy and geology; botany; zoology, comparative anatomy and physiology; technical chemistry; and agronomical chemistry.[67] Although it would appear from the number of departments that the emphasis on the natural sciences far outweighed that on mathematics and related disciplines, in view of other criteria, this was not so, and the Physico-mathematical Faculty of Moscow University serves as a case in point. In 1863 it was divided into two sections, that of the mathematical sciences and that of the natural sciences, for two reasons: the greater specialization of students and the increasing development of natural science.[68] This followed exactly the pattern toward supposed greater specialization undertaken by the Main Pedagogical Institute in 1849.[69]

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[63] Hans, op. cit., p. 77.

[64] Ibid.

[65] P. S. Aleksandrov, et al. (eds.), Istoriia Moskovskogo universiteta /History of Moscow University/, Vol. I (Moscow: Izd. Moskovskogo universiteta, 1955), p. 256.

[66] The Statute specified 11, 10, 12, and 23 departments for the historico-philological, physico-mathematical, juridical, and medical faculties, respectively. Ibid.

The universities were quick to exercise the prerogative, extended them by the 1863 Statute, of deciding their own programs.[70] In fact, the educational plan introduced by the Physico-Mathematical Faculty of Moscow University, which was predicated on the 1863 Statute of the Universities, closely resembled that drawn up on the initiative of faculty members and implemented in 1862.[71] The 1863 program is summarized below:

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[67] Ibid., p. 257.

[68] Ibid.

[69] Cf. footnote #58, p. 55.

[70] Cf. p. 59. (for quotation denoted by footnote #65).

[71] Aleksandrov, Vol. I, op. cit., p. 258.

## TABLE 7

## FOUR-YEAR PROGRAM OF PHYSICO-MATHEMATICAL FACULTY OF MOSCOW UNIVERSITY BY DEPARTMENTS (1863)[72] (NUMBER OF HOURS PER WEEK)

| Section | Mathematics | | | | Natural Science | | | | Total Subject Hours | |
|---|---|---|---|---|---|---|---|---|---|---|
| Course (year) / Subject | I | II | III | IV | I | II | III | IV | | |
| Theology | 6 | | | | 6 | | | | 6 | 6 |
| Physics | 4 | 4 | | | 4 | 4 | | | 8 | 8 |
| Mathematics | 5 | | 2 | 2 | 5 | | | | 9 | 5 |
| French & German languages | 3 | | | | 3 | | | | 3 | 3 |
| Descriptive geometry | 1 | | | | | | | | 1 | |
| Chemistry | | 4 | 4 | | | 4 | 4 | 2 | 8 | 10 |
| German language | | 1 | 2 | | | 1 | 2 | | 3 | 3 |
| Astronomy & geodesy | | 2 | | | | | | | 2 | |
| Physical geography | | 2 | | | | | | | 2 | |
| Practical mechanics | | 2 | 1 | | | | | | 3 | |
| Pure mathematics | | 2 | | | | | | | 2 | |
| Agriculture | | | 3 | 3 | | | 3 | 3 | 6 | 6 |
| Astronomy | | | 2 | 2 | | | | | 4 | |
| Practical astronomy | | | 2 | 4 | | | | | 6 | |
| Mathematical physics | | | 2 | 2 | | | | | 4 | |
| Statics | | | 3 | | | | | | 3 | |
| Theory of probability | | | 1 | | | | | | 1 | |
| Dynamics | | | | 4 | | | | | 4 | |
| Geodesy | | | | 2 | | | | | 2 | |
| Zoology | | | | | 2 | 2 | 5 | 3 | | 12 |
| Botany | | | | | 2 | 2 | | | | 4 |
| Anatomy of human body | | | | | 2 | 1 | | | | 3 |
| Technology | | | | | | | 3 | 3 | | 6 |
| Anatomy of plants | | | | | | | 3 | 3 | | 3 |
| Mineralogy | | | | | | | 3 | | | 3 |
| Geology | | | | | | | | 4 | | 4 |
| Physiology of plants | | | | | | | | 3 | | 3 |
| Comparative anatomy | | | | | | | | 4 | | 4 |
| Total Hours Per Dept. | | | | | | | | | 77 | 83 |
| Total Hours Per Class Year | 19 | 17 | 22 | 19 | 24 | 14 | 23 | 22 | | |

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[72] Data for table compiled from account in Aleksandrov; op. cit., pp. 258-259.

This program exhibits three significant features with respect to the preparation of students in mathematics or for mathematics teaching. *First*, the division of the faculty into mathematics and natural science departments, indicates *marked compartmentalization* within each department, in that only six subject categories (combining "German language" and "French and German languages" into a single category) are common to both curricula and account for only roughly 50% of the total hours in each. Nonetheless, such organization fails to capitalize on the opportunity to have the student specialize for the remaining half of his course work due to the breadth and variety of general-type courses peculiar just to his department. *Second*, the practical, or applied, nature of mathematics in the mathematics department occupies a liberal share of the curriculum,[73] which implies that the principal objective is to prepare pupils in mathematics-related disciplines for utilitarian purposes.[74] *Third*, in neither department is there any evidence of courses in pedagogy, either in the general sense or in relation to the teaching of a particular discipline. As already indicated,[75] universities had by this time established their own chairs of pedagogy. There is a possibility that these chairs were attached to the historico-philological faculties, rather than to the physico-mathematical faculties. However, interdepartmental coursework not only was discouraged, but also there is no evidence of it at all[76]--implying that allowances for pedagogy had to be made by the faculties individually. Unless the teaching of mathematics, for example, is implicitly understood to be a facet of the "mathematics" course, which seems unlikely, then the assumption must be drawn that, despite isolated endeavors,[77] the role of pedagogy was minor, if not in fact non-existent, in Moscow University.

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[73] Excluding the *general* mathematics-related disciplines, such as physics, chemistry, and astronomy, and including only the purely *applied* aspects of these disciplines and that of mathematics (practical mechanics, agriculture, practical astronomy, mathematical physics, statics, dynamics, and geodesy), 28 hours, or 36.4%, of the curriculum is definitely utilitarian in scope.

[74] Strictly mathematical preparation (mathematics, descriptive geometry, pure mathematics, and theory of probability) accounts for only 13 hours, or 16.9% of the curriculum.

[75] *Supra* p. 55. (including footnotes #59 and #60).

The period from 1863 to the assassination of Alexander II in 1881, although filled with many student demonstrations in opposition to the autocratic methods of Count D. Tolstoi, Minister of Public Instruction (1866-1880), did not witness any significant changes in the curricula of physico-mathematical faculties. However, as a result of the passage of the decree in 1871 allowing women to enter civil service,[78] primarily into teaching and medicine, the preparation of teachers for the upper secondary level, which required a higher education, took on a new perspective. The Statute for Women's Higher Courses, which were equivalent to university courses, was issued in April, 1876.[79] Women were not only free to teach at the secondary level, but they too would soon enroll in physico-mathematical faculties.[80]

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[76] Aleksandrov says of the "course system," which was in effect at this time: "The course system created well-known barriers for contact between students of different faculties. For this purpose administrative measures too were applied. Even within a faculty the attendence of lectures in other courses was prohibited." Aleksandrov, Vol. I, op. cit., p. 382.

[77] Cf. footnote #60, p. 55.

[78] Hans, op. cit., p. 130.

[79] Ibid.

The period of reaction following Alexander II's assassination in 1881 led to the new University Statute of 1884, which abrogated many of the powers granted to universities by the Statute of 1863.[81] University administrative functions underwent drastic change and student rebellions proliferated, but what impact did the 1884 Statute have on the physico-mathematical faculties of the universities?

The departmental structure of these faculties remained virtually unchanged from that of 1863,[82] except for a few minor modifications. An eleventh department, geography and ethnography, was created. Also, the "mechanics" departments in 1884 became known as departments of "theoretical and applied mechanics," while those of "technical chemistry" and "agronomical chemistry" were changed to the "technology and technical chemistry" and "agronomy" departments, respectively.[83] The maintenance of the status quo in faculty organization found its reflection in the preservation of existing curricular programs in the physico-mathematical faculties. Referring to this period in the history of the universities, A. P. Iushkevich, prominent Soviet mathematics historian, asserts: "The programs of the physico-mathematics faculties were notable for a long time still for their breadth of scope and at the same time comparatively little specialization."[84] The departments with the largest staffs were those of pure mathematics, physics and physical geography, chemistry, and that of zoology, comparative anatomy, and physiology.[85] In these departments were concentrated the more theoretical, classical-type studies, and with the exception of the last-named department above, they were the principal departments, which, under the indicated partitioning of the physico-mathematical faculty in 1863 into the academic biases of mathematics and natural science,[86] offered courses common to both tracks.

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[80] Prior to this time the attendance of women at higher educational institutions maintained by the State was restricted to the Military Medical Academy. Ibid.

[81] Ibid.

[82] Supra , p. 61 (Table 7 on Four-year Program of the Physico-Mathematical Faculty of Moscow University by Departments/1863_/ ).

[83] A. P. Iushkevich, "Matematika i ee prepodavanie v Rossii XVII-XIX vv." /Mathematics and Its Teaching in Russia, 17th-19th centuries"_/, Matematika v shkole /Mathematics in the School_/, No. 3 (May-June, 1949), 7.

According to the Statute of 1884, the subject system was to replace the course system in the programs of the universities.[87] This meant that several variations of an education plan were established by each faculty, and the student was allowed to hear lectures in any sequence and by any instructors according to the plan selected by him.[88] Examinations were removed from the jurisdiction of the faculties and administered only by special examination commissions.[89] However, by

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[84] *Ibid*.

[85] Aleksandrov, Vol. I, *op. cit.*, p. 381.

[86] *Supra*, p. 60.

[87] Aleksandrov, Vol. I, *op. cit.*, p. 382.

[88] *Ibid*.

[89] *Ibid*.

1890 a return to the "course system" /italics mine/ had already occurred with the re-establishment of single educational plans prescribing compulsory courses and with the return to instruction "within the limits of a faculty division into a few specialties of a general character."[90] The attempt of a reactionary regime to control teaching more closely was the sole motivation for this abortive attempt.[91]

The regressive University Statute of 1884 was followed by other reactionary policies, including discrimination against the lower social classes and minority nationalities, raising of tuition fees, abolishment of student self-government, and vast reduction of the autonomy of universities. These and similar measures for the next three decades prompted frequent student disturbances, thereby impeding the academic functioning of universities. The universities during these years indeed were "hotbeds of socialism and revolution,"[92] and accounts of student expulsions and imprisonments are numerous. The decrees immediately following the 1905 Revolution repealed many of the harsh measures of the 1884 University Statute and reintroduced some of the liberal rights granted by the Statute of 1863. The students' return to matters primarily academic was, however, limited to the term of office of Count I. I. Tolstoi, Minister of Public Instruction (1905-1906). Reaction again set in and steadily rose, reaching a climax with the death of the popular author and educator, Count Leo Tolstoi, and the outlawing in 1911 of all student gatherings not previously approved.[93] Resignations were submitted by a majority of the most progressive professors at this time also.[94] It was not until the First World War that attention was diverted from the universities and student demonstrations ceased.[95] The significance of this series of retaliations both by the State and by the university community lies in its negative impact on academic progress at a time, described by Johnson, when "demands grew in geometrical progression, whereas the reforms proceeded only in an arithmetic progression."[96]

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[90] Ibid.

[91] It is noteworthy that the Soviet historian, P. S. Aleksandrov, records the failure of this reform with a note of consternation, claiming that "under the conditions of a reactionary /italics mine/ regime the course system inevitably must and did lead to the lowering of the students' interest toward many lecture courses." Ibid. From this, it is interesting to ponder what changes, if any, might be expected with respect to such lecture courses under the conditions of a revolutionary regime?

[92] A. J. Sack, cited by Johnson, op. cit., p. 183.

Count P. N. Ignatiev, who, as Minister of Public Instruction (1915-1916), earlier was mentioned for his reform of the secondary school curriculum,[97] deserves attention also for his work relating to the universities. He granted pupils of Church seminaries, commercial schools, and Real secondary schools, whose programs differed from those of the Classical Gymnasia, the right to enter State universities, which previously had been restricted to graduates of Classical Gymnasia.[98] This, together with the reinstatement of the right of women to enter the universities and the increase of university quotas for minority groups, helped to neutralize the effects of increased mobilization of students for the War. Cultural and political urgency helped bring about quickly what individual educators had for decades sought in vain.

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[93] Ibid., p. 182.

[94] Sergei I. Vavilov, Tridtsat' let sovetskoi nauki /Thirty Years of Soviet Science/ (Moscow-Leningrad: Izd. Akad. nauk SSSR, 1947), p. 16.

[95] Hans, op. cit., p. 204.

[96] Ibid., p. 195. The selection of the dates of 1863, 1884, and 1915 in Table 8, p. 69 as key, characteristic periods showing the sequential development of the organization of the Physico-Mathematical Faculty of Moscow University, 1863-1915, especially the relatively long span of time between 1884-1915, is explained in part by the frequency of disturbances and resulting lack of meaningful progress during this interim.

[97] Supra, p. 42 (Table 5 on Secondary School Curricula Under the Ignatiev Plan/1916/.

By the 1914/1915 academic year, the structure of the Physico-Mathematical Faculty of Moscow University, as in 1884, differed little fundamentally from that of 1863 with its division into two sections--mathematics and natural science. Under the Mathematics Section there were subsumed the following four departments or specialties--the latter designation apparently supplanting that of "departments" by the turn of the century: mathematics; mechanics; astronomy; and physics and physical geography.[99] The former departments of the Natural Science Section were now called special cycles--this designation for academic departments being preferred in the Natural Sciences Section to its counterpart in the Mathematics Section, "specialties." Comprising the Natural Science Section were the following special cycles: physico-chemistry, technical chemistry, soil science, agronomical chemistry, crystallography and mineralogy, geology, botany, zoology, physiology of plants, geography, and anthropology.[100]

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[98] Hans, op. cit., p. 204.

[99] Aleksandrov, Vol. I, op. cit., p. 384.

The organizational development of the Physico-Mathematical Faculty of Moscow University is summarized below:

TABLE 8

ORGANIZATION OF THE PHYSICO-MATHEMATICAL FACULTY OF MOSCOW UNIVERSITY 1863-1915[101]

|  | No. | 1863 (departments) | 1884 (departments) | 1915 (specialties or special cycles) |  |
|---|---|---|---|---|---|
| Mathematics Section | 1 | Pure mathematics - - - - - - - → |  | Mathematics | Specialties |
|  | 2 | Mechanics ——→ | Theoretical and applied mechanics ——→ | Mechanics |  |
|  | 3 | Astronomy and geodesy - - - - - - - → |  | Astronomy |  |
|  | 4 | Physics and physical geography - - - - - - - → |  |  |  |
| Natural Science Section | 5 | Chemistry - - - - - - - → |  | Physico-chemistry | Special cycles |
|  | 6 | Mineralogy and geology - - - - - - - < |  | Crystallography<br>mineralogy<br>Geology |  |
|  | 7 | Botany - - - - - - - → |  |  |  |
|  | 8 | Zoology, comp. anatomy, & - - - - - - - < |  | Zoology<br>Physiology of plants |  |
|  | 9 | Technical chemistry ——→ | Technology and technical chemistry ——→ | Technical chemistry |  |
|  | 10 | Agronomical chemistry ——→ | Agronomy ——< | Soil science<br>Agronomical chemistry |  |
|  | 11 |  | Geography and ethnography ——< | Geography<br>Anthropology |  |

- - - - - - - (dotted line) indicates no change

———— (continuous line) indicates modification

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[100] Ibid.

[101] Data for 1863, 1884, and 1915 extracted from pp. 60, 64-65, and 68-69, respectively.

With respect to the Mathematics Section (categories 1-4), the table above indicates that for the given time interval there was little change overall. The transition from "pure mathematics" departments to "mathematics" specialties is indicative of a possible change of emphasis, which anticipated Soviet educational policies. Although the Natural Science Section exhibits some inclination toward greater specialization and polytechnical training, its changes seem more "semantic" than real.

Greater specialization of students in the Physico-Mathematical Faculty of Moscow University was realized, however, when additional or supplementary courses (dopolnitel'nye kursy) were introduced in the VII and VIII semesters (final year of study) for all specialties.[102] Despite the appearance of such subjects as the history of mathematics and the history of pedagogy in the Historico-Philological Faculty beginning with the 1908/1909 academic year, the Mathematics Section of the Physico-Mathematical Faculty did not establish additional courses until the 1914/1915 academic year.[103] Although termed "additional" or "supplementary" courses upon their inception, they were of two different types: compulsory (obiazatel'nyi) or special (spetsial'nyi). "Additional" courses for the specialty of mathematics, all compulsory in type, included lecture courses in projective geometry, history of mathematics, and integral calculuses, as well as a mathematics seminar.[104] For the specialties of mechanics, astronomy, and physics, the "additional" courses included both special courses, which were non-compulsory or elective in nature, and those of the compulsory type.

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[102] Aleksandrov, Vol. I, loc. cit.

[103] Ibid.

[104] Ibid.

Compulsory courses too were given in the Natural Science Section during semesters I-VIII. In contrast to the Mathematics Section, however, "additional" courses, which were compulsory for given specialties, were recommended already from the first term of study.[105] The number of special courses of the elective type also appeared numerous. Specialization in the Natural Science Section, by virtue of its significant development even in the early semesters, was much more pronounced than in the Mathematics Section of the Physico-Mathematical Faculty just prior to the Revolution.

The rise in enrollments in the Physico-Mathematical Faculty of Moscow University from 1895-1910 is indicative of the increasing scientific and technical needs of the Russian economy. At the turn of the century it not only reached, but also began to surpass that of the Medical Faculty (roughly 1400 students in each in 1900), so that by 1910 its numerical advantage over the latter was 678 pupils,[106] for a total enrollment of about 2100. Whereas the Juridical Faculty retained first place in absolute numbers with an enrollment of 3890 in 1910, which represented an increase of 2303 students over its 1896 enrollment, the relative growth in the Physico-Mathematical Faculty over the same span was much greater (245% to roughly 1400%, respectively, based on the fact that the Physico-Mathematical enrollment amounted to only 148 in 1895).[107] Only during time of war (as of 1916) did these two faculties enroll less than did the Medical Faculty. The Historico-Philological Faculty occupied last place in enrollment throughout this time interval. The graph below, based on the foregoing statistics, more clearly depicts the enrollment trends of these faculties:

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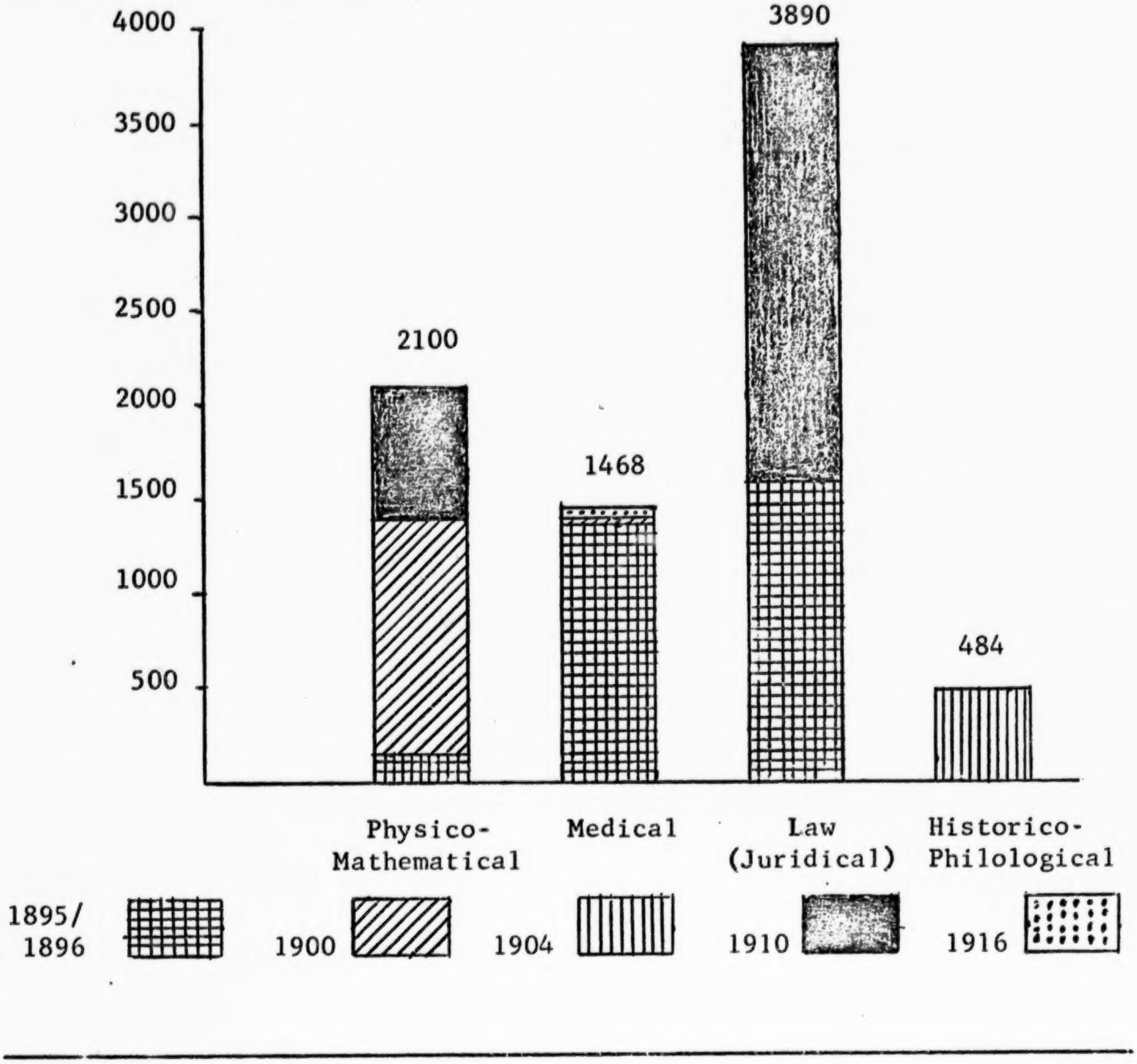
[105] Ibid.

[106] Ibid., p. 369.

TABLE 9

FACULTY ENROLLMENTS IN NOSCOW UNIVERSITY, 1895-1916[108]



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[107] Ibid.

[108] Graphs in Table 9 drawn according to data in Ibid.

The relative backwardness of Russian technology became readily apparent with the defeat of the army of the Tsar in the spring and summer of 1915 in the "First Imperialistic World War."[109] This spurred greater interest in the work of the physico-mathematical faculties of universities, particularly of their natural science sections, and undoubtedly was a factor in the tendency toward increased specialization in Moscow University indicated earlier.[110] While the utilization of university laboratories and the attraction of individual professors to work connected with industry, soon after the defeat, was characterized as still sporadic and primitive,[111] nevertheless, the beginning of such a movement is significant.

By the time of the 1917 overthrow of the tsarist regime, known as the "February Revolution," there were twelve universities in Russia: *Moscow (1755), Yuri (1802), *Kazan (1804), Kharkov (1804), *Petrograd /Petersburg/ (1819), Kiev (1833), Novorossiisk in Odessa (1864), Warsaw (1869), *Tomsk (1888), *Saratov (1912), *Perm (1916), and Helsingfors (Helsinki).[112]

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[109] Ibid., p. 475.

[110] Cf.

[111] Aleksandrov, Vol. I, loc. cit.

[112] "Vysshee professional'no-tekhnicheskoe obrazovanie" /"Higher professional-technical education"/, Pedagogicheskaia entsiklopediia /Pedagogical Encyclopedia/, ed. A. G. Kalashinkov, III (1930), 183. Universities marked with an asterisk (*) are those later included in the territory of the Russian Soviet Federated Socialist Republic (R.S.F.S.R.), the largest of the fifteen republics established under Soviet rule. Years within parentheses refer to dates of founding of the universities.

Having passed through the turbulence of continuous reaction and reform, the universities, with Ignatiev's extension of the right of university enrollment to qualified graduates of all types of secondary schools, had become officially democratized prior to 1917. The organization of the physico-mathematical faculties, specifically that of the University of Moscow, which, because of its central location and leading role in the Imperial educational system, must be accepted as highly representative of official educational policy, had come to exhibit a rather balanced blending of theoretical, or general, studies with those having a more specialized, utilitarian emphasis. The dichotomy between the pedagogical implications of classicism and realism, touched upon already in the discussion of secondary education,[113] was somewhat reconciled by the division of the physico-mathematical faculties into the more theoretically oriented mathematics sections, with their emphasis on general preparation, and the more specialized, utilitarian natural science sections.

This belated attempt at reconciliation raises a number of searching questions. Would the materialistic philosophy of the revolutionary Soviet regime, which was bent on equalling and then surpassing the industrial-technical achievements of the western capitalist countries, upset this balance in favor of one or the other bias to attain immediate and pragmatic goals, thereby effecting concomitant changes in the preparation of university-bound students at the secondary level? With the establishment in the Soviet period of a vastly broadened network of higher technical institutions--the counterparts of universities in the vocational/technical structure of education, would the distinction between "pure" and "applied" mathematics not only be made more frequently, but also result primarily in the association of the former ("pure") with mathematics coursework in the university and that of the latter ("applied") with mathematics coursework in the higher technical educational institution, respectively? If so, what would be its effect on the system of secondary education? Would the Soviet regime, pressed by the economic exigencies of vastly accelerated industrialization, have to accede to the expedient of establishing a dual network of elementary/secondary education in order to fit the academic preparation of pupils to the academic orientation (i.e., "pure" or "applied") of one or the other structure of higher education? Thus, would the Soviet regime, initially bent on creating a unified system of elementary/secondary schooling, be forced to duplicate the dual network of the Imperial educational system at all levels of instruction? Finally, if Soviet education followed through on its claims to open the university to all classes of people without regard to their academic qualifications generally, and preparation in mathematics specifically, would the type of preparation offered by secondary educational institutions reflect this compromise of academic standards? These are some of the salient questions relating to the numerous alternatives of mathematics instruction, as suggested by developments in the area of mathematics in the general educational structure of higher education in Imperial Russia, with which Soviet educators would have to contend.

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[113] _Supra_, pp. 47-51.

# Part II

## The Vocational/Technical Structure

### Introduction: the relative significance of vocational/technical education in Imperial Russia

A common observation made in historical literature on early Soviet society is the fact that, "a traveler in the Soviet Union in the 1920's was constantly reminded of the cultural and technical backwardness of the country."[114] While this remark of George Counts is indeed correct, it would be incorrect to interpret it as evidence that technical/vocational institutions in Imperial Russia did not exist. The inordinate Soviet emphasis on "socially useful labor" and on the "bridging of the gap between theory and practice" has further strengthened a conviction ascribing to the Soviet regime full credit for all advances in polytechnical and technical training. The fact that there was a technical/vocational structure in the system of Imperial education, parallel to the general structure of education, needs to be evaluated in the context of this study. Lest the mistake of building a case for "mountains of anthills" befall this investigation, it is important that the relative size of this structure be put in its proper perspective and the extent of its treatment here be determined accordingly.

In order to achieve this proper perspective, numerical comparisons between the sizes and enrollments of the vocational/technical and general structures of Imperial education must be made at all levels. The following table makes this comparison.

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[114] George S. Counts, The Challenge of Soviet Education (New York: McGraw-Hill Book Company, Inc., 1957), p. 14.

## TABLE 10

## COMPARISON OF GENERAL EDUCATIONAL AND VOCATIONAL/TECHNICAL STRUCTURES[115] OF IMPERIAL EDUCATION, 1914/1915

| Structures of Education | | | | | |
|---|---|---|---|---|---|
| No. of Schools | No. of Pupils | General Educational | Vocational/ Technical | No. of Schools | No. of Pupils |
| 104,610 | 7,235,988 | [1] Elementary | | | |
| 1,790 | 563,480 | [2] Secondary | [4] Lower & Secondary | 2,877 | 266,982 |
| 35 | 66,100 | [3] Higher (universities & gen. ed. inst.) | [5] Higher (institutes & special inst.) | 56 | 58,600 |

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[115] Figures for categories [1]-[5] in Table 10 compiled from data from the following five sources, abbreviated hereafter as a, b, c, d, e, respectively:

a Hans, op. cit.
b Sergius Hessen and Nicholas A. Hans, Educational Policy in Soviet Russia (London: P. S. King & Son, Ltd., 1930).
c Johnson, op. cit.
d "Narodnoe obrazovanie" ["Public Education"], Malaia soveskaia entsiklopediia [Small Soviet Encyclopedia], ed. N. L. Meshcheriakov, V (1931), 572.
e "Vysshee professional'no-tekhnicheskoe obrazovanie" ["Higher Professional-Technical Education"] Pedagogicheskaia entsiklopediia [Pedagogical Encyclopedia], ed. A. G. Kalashnikov, III (1930), 265-266.

Each of the figures is validated by two sources in order to ensure its reliability (without combining sources a and b, owing to their common authorship). Category [5] was indirectly obtained by taking the sum of categories [3] and [5], as given in sources b and d, and subtracting that of [3], as given in e. Category [3] includes the total enrollment of the nine All-Russian universities (that is, State-operated universities, and excludes those in Poland and Finland) and other general educational higher institutions. The 1914/1915 enrollment of these nine universities, which is obtained by taking the 1912 university enrollment of 34,538 (given by sources a and c) and that of 1916 (found in c) as 35,695, is approximated at 35,000 students. Statistics are taken for the 1914/1915 academic year, as they are most representative of the progress of Imperial education, due to subsequent irregularities in enrollments created by World War I.

Specific bibliographic references for categories [1] - [5] are:

| | |
|---|---|
| [1] : b, p. 232; d, p. 572. | [4] : b, p. 232: d, p. 572. |
| [2] : b, p. 232; d, p. 572. | [5] : b, p. 232; d, p. 572. |
| [3] : e, pp. 265-266 (universities: a, p. 238; c, p. 287). | |

Because they "gave general [italics mine] secondary education for those groups which were discontented with the secondary schools of the Ministry of Public Instruction or to whom access was debarred, as for example the Jews" (Hessen and Hans, op. cit., p. 141), the Commercial Schools of the Ministry of Finance, which, according to source a, numbered 217 with an enrollment of 51,632 in 1913-1914, are not included in the figures of category [4].

More contemporary statistical sources, such as the following, give the total number of higher educational institutions (sum of categories [3] and [5] for 1914/1915 as 105 institutions with a total enrollment of 127,400 students:

E. V. Chutkerashvili, Razvitie vysshego obrazovaniia v S.S.S.R. [The Development of Higher Education in the U.S.S.R.] (Moscow: Gosudarstvennoe izdatel'stvo, 1961, p. 8.

Seymour M. Rosen, Higher Education in the U.S.S.R. (Washington: U.S. Government Printing Office, 1963), pp. 100-101. [Translated from Vysshee obrazovanie [sic] v SSSR (Higher Education in the U.S.S.R.), which was prepared and published in 1961 by the Central Statistical Administration, attached to the U.S.S.R. Council of Ministers, Moscow].

These statistics, however, are in accordance with the contemporary boundaries of the Soviet Union, whereas those of Table 10 above correspond to the 1915 boundaries of Russia, which remained unchanged up to September, 1939.

The lower and secondary levels of the vocational/technical structure have been combined into a single category ( [4] ) in Table 10 for two reasons: 1) the difficulty in differentiating "lower" vocational from "middle" vocational schools, notwithstanding the overlapping of the latter ("middle") schools in terms of type and quality of preparation with those professed to be professional secondary schools; 2) the indiscriminant grouping of both levels in statistical literature on Imperial education, which undoubtedly results from the fact that "the vocational schools were to form a second grade to the existing schools, giving a general education."[116] That is, vocational training was to follow a minimum of 2-3 years of elementary preparation in the general education structure, and as such, was a secondary educational superstructure of sorts. Thus, the discussion of vocational/technical education will include only the secondary and higher educational levels.

Numerically speaking, the comparison of the "secondary" (category [2] and "lower and secondary" (category [4] enrollments is favorable in the sense that it is not lopsided, where the latter category is roughly half that of the former. Notwithstanding this fact, however, by removing such vocational institutions as Crafts Schools, Trade Schools and Classes, and Agricultural and Commercial Courses, all of which were three years or less in duration and rather elementary in scope, the enrollment of the vocational/technical category [4] is reduced by more than half.[117]

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[116] Hans, op. cit., p. 152.

[117] Cf. Table 10 of Hans, op. cit., p. 237.

This numerical disparity, however, provides only a quantitative rationale for limiting the investigation of the types of lower and secondary institutions of vocational/technical education to those which, in a qualitative sense, played a significant role in the development of mathematics education. The qualitative criterion, which is partly governed by additional quantitative criteria as "how much," "what level of desired proficiency," is whether mathematics instruction in a given type of institution was, for the most part, rather rudimentary in nature and subordinated to training for a particular specialty, or whether it was regarded in the curriculum as having intrinsic value. That is, was mathematics regarded as playing an integral part in the pupil's preparation, or was it ascribed a strictly pragmatic role--a means whereby proficiency in some other specialty resulted? Under such a criterion, the Teachers Seminaries and Institutes, due to their role in the preparation of teachers, who, in turn, had the teaching of mathematics as an important aim, alone will be focused upon in some depth.

The higher educational institutions in the Imperial technical/vocational structure encompassed the following specialties: medicine, agriculture, technology and transportation, economics, performing arts, and pedagogy. Owing either to the complete absence of mathematics instruction in some specialties, or to the heavy emphasis on specialized technical preparation in others (agriculture, technology and transportation, economics), with a concomitant subordination of mathematics as primarily an instrument facilitating technological application, subsequent discussion here will be limited to higher pedagogical institutions.

Pre-Revolutionary lower/secondary educational institutions

Although vocational schools existed prior to the reign of Alexander II (1855-1881), they were scarce and non-centralized. Hence, the origin of vocational education in Russia is commonly associated with the approval in March, 1888, of the "general scheme of professional education in Russia" prepared by the Department of Professional Education, which was established under the Ministry of Public Instruction in 1884.[118]

Four grades of vocational education were instituted by this Statute: a) higher institutions, b) Middle Technical Schools, c) Lower Technical Schools, and d) Crafts and Industry Schools.[119] The last three types (b, c, d) range from secondary to lower vocational schools.

Middle Technical Schools bore some comparison with the Real Schools. That the Real Schools imparted a general education in indicated by their stress on the natural sciences and mathematics. When one considers that two more years of study by a pupil in the Real School, rather than his leaving it after the fifth year to enter a

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[118] *Ibid*., pp. 151-52.

[119] *Ibid*., pp. 152-53. Pupils from the fifth class of the Real School were accepted into the Middle Technical School, which, in its four-year course, *prepared assistant engineers*. Sixth-year pupils of the Municipal Schools could enter the Lower Technical School, the three-year course of which *prepared skilled foremen*. Upon completion of 2-3 years of study, elementary school pupils could enter the Crafts School, which *turned out skilled workmen* in three years.

Middle Technical School, gave the pupil the right to enter a higher institution with its advanced academic qualification, the difficulties in expanding the Middle Technical School enrollments become readily discernible. In addition, referring to all three types of vocational schools, Hans contends that, "the undue specialization of all these schools did not attract capable boys and only those who failed in the ordinary schools entered them."[120] Herein lies the principal explanation for the disparity in the percentages of pupils in lower-secondary vocational schools compared to those in secondary schools in the general educational structure, as shown in Table 10, page 77 (the enrollment of the former amounts to 47.4% of the latter). Technicians and specialists with medium-level skills were sorely needed following what Alexander Vucinich describes as "the universal and buoyant growth of Russian science during the 1860's."[121] The production statistics below attest to the fact that, although the full impact of the Industrial Revolution reached Russia between 50-100 years after Western Europe, it too had arrived in Russia by the turn of the twentieth century:

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[120] Hans, op. cit., p. 153.

[121] Alexander Vucinich, Science in Russian Culture (Stanford: Stanford University Press, 1963), p. 389.

## TABLE 11

## PRODUCTION IN MAJOR INDUSTRIES IN IMPERIAL RUSSIA (IN TONS), 1860-1900[122]

| Year | Total coal mined | Total oil produced | Total iron mined | Pig iron smelted | Steel & iron produced |
|---|---|---|---|---|---|
| 1860 | 329,400 | | | 352,800 | 223,200 |
| 1870 | 763,200 | 32,400 | 825,750 | 372,600 | 261,000 |
| 1880 | 3,610,800 | 612,200 | 1,083,600 | 469,800 | 635,400 |
| 1890 | 5,049,600 | 4,348,000 | 1,913,400 | 993,600 | 871,200 |
| 1895 | 9,999,000 | 6,948,000 | 3,024,000 | 1,561,900 | 1,121,400 |
| 1900 | 17,913,000 | 11,376,000 | 6,609,600 | 3,182,400 | 2,419,200 |

Thus, the flowering of Russian scientific thought in the 1860's found its practical sequel in the rapid expansion of industry in the 1890's. The establishment of the structure of secondary vocational education in 1888 was an attempt to keep pace with the industrial growth depicted in Table 11 above, by providing the necessary technical-scientific force at medium skills level. However, the need for such workers far outdistanced the supply forthcoming from the vocational schools, despite their continual growth up to the Bolshevik Revolution in 1917. Their inability to attract more pupils from schools of the general education structure, particularly from the Municipal Schools and the Real Schools--both having a heavy curricular emphasis on mathematics,[123] continued the predominance of general-type education generally, and that of natural science and mathematics particularly, at the lower and secondary levels of schooling. The manpower needs of society, while rapidly increasing in geometric proportions, had not yet seriously affected educational policy at these levels. By contrast, due to the impossibility of Real School graduates to enter universities prior to 1915, the higher educational institutions of the technical/ vocational structure competed favorably in enrollments with those of the general education structure.[124] The result was that they could afford to be more selective in their recruitment policies and more academically innovating in curricular policies.

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[122] P. I. Liashchenko, Istoriia narodnogo khoziaistva SSSR /History of the National Economy of the U. S. S. R./ Vol. II (Moscow: State Publishing House, 1948), pp. 148-289.

[123] Supra, pp. 33-35, 42-44 (for accounts and tables illustrating Municipal School and Real School emphases on mathematics, respectively).

Similar to any developing society faced with pressing economic exigencies, Imperial Russia had to find new ways of satisfying increasing demands for teachers at all levels. Secondary pedagogical institutions of the vocational/technical structure played a major role in this respect. As early as 1863 A. V. Golovnin, Minister of Public Instruction (1862-1866), began experimenting with two "teachers seminaries" in Kiev and Vilna.[125] The most prominent of all Teachers Seminaries was founded the following year in 1864 at Molodechno. Much planning went into its creation, since it was designed to serve as a model for subsequent Teachers Seminaries.[126]

Those who graduated from the elementary District School, and who then desired to teach in the same, were allowed into the two-year course of the Molodechno Seminary. Its curriculum of eleven subjects, which is shown below, was not much different from that of the three-year District School.[127]

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[124] Cf. Table 10 , p. 77.

[125] Johnson, op. cit., p. 165.

[126] Ibid., p. 166

TABLE 12

CURRICULUM OF MOLODECHNO TEACHERS SEMINARY[128]
(NUMBER OF HOURS PER WEEK)

| Subject | Junior Class (1st Year) | Senior Class (2nd Year) | Totals |
|---|---|---|---|
| Divine law | 4 | 3 | 7 |
| Methods | - | 2 | 2 |
| Russian language | 5 | 4 | 9 |
| Slavonic language | 2 | 1 | 3 |
| Geography | 2 | 2 | 4 |
| History | 2 | 2 | 4 |
| Natural history | 3 | 3 | 6 |
| Arithmetic | 4 | 3 | 7 |
| Geometry, geodesy, & linear drawing | 2 | 2 | 4 |
| Singing | 2 | 2 | 4 |
| Penmanship | 2 | 2 | 4 |
| All subjects | 28 | 26 | 54 |

However, 35.0% of the curriculum of the District School was devoted to mathematics, compared to only 20.4% of that of the seminary (combining the categories of "arithmetic" and "geometry, geodesy, & linear drawing"). This difference is explained by the increase in the number of subjects offered by the latter (methods, Slavonic language, natural history, and singing). The comparison indicates that the preparation of the Seminary initially was an intensification and extension of the fundamental education of the elementary institutions for which it prepared teachers.

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[127] Cf. (District School curriculum) Table 3, p. 34.

[128] Johnson, op. cit., p. 280.

Bernard Pares (British historian), in comparing a Teachers Seminary directly under the Ministry of Public Instruction with that of the Tver zemstvo in 1904-1905, suggests certain progress in the quality of Seminary training following its inception. The course of the Seminary had increased from two to four years by this time, resulting in a commensurate expansion of the curriculum to include such additions as courses in algebra and physics.[129] Work in methods of teaching was no longer a nominal two-hour course in the last year. Instead, it spanned the last two years of instruction (3rd and 4th classes), the first of them constituting the theoretical phase of pedagogy,[130] the second focusing on actual teaching practice in the school.[131]

On the basis of the "Decree on Teachers Seminaries" of 17 March, 1870, the government and zemstva established Teachers Seminaries in various cities and rural areas.[132] Such official sanction resulted in the expansion of the network of these institutions, as indicated in the table below:

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[129] Ibid., p. 215.

[130] Ibid., p. 216. An integral part of the first phase was the writing of essays by the students on how to teach, which were personally to be corrected by the Director of the Seminary.

[131] For an extensive treatment of methods employed in Teachers Seminaries up to 1917, see the article of A. Arsen'ev, "Pedagogicheskaia praktika v dorevolutsionnykh uchitel'skikh seminariiakh Rossii" /"Pedagogical Practice in Pre-Revolutionary Teachers Seminaries of Russia"/, Sovetskaia Pedagogika / Soviet Pedagogy /, No. 9 (September, 1938), 91-109.

[132] "Uchitel'skie seminarii" /"Teachers Seminaries"/, Pedagogicheskii slovar' / Pedagogical Dicktionary /, Vol. II, 548.

## TABLE 13

## NUMBER AND ENROLLMENT OF TEACHERS SEMINARIES IN IMPERIAL RUSSIA[133]

| Year | 1870 | 1875 | 1881 | 1895 | 1904 | 1910 | 1913 | 1916 |
|---|---|---|---|---|---|---|---|---|
| No. of Seminaries/Enrolment | 3/n.a. | 34/1847 | 39/2527 | 60/4600 | 72/ 11,333 | 87/ 8,254 | 102/ 12,190 | 126/n.a. |

The level of general knowledge taught in the Seminaries was below that of secondary institutions of the general educational structure. Comparing the eleven subjects of its curriculum with the thirty-odd subjects of the Pedagogical Institutes, which, until their abolition in 1859, were attached to the universities, one can only disparage the quality of the Seminary curriculum. Since the graduates of seminaries received a preparation qualifying them to teach only in the District School and in similar lower elementary schools, what provision existed for preparing teachers for the upper elementary schools, particularly the Municipal (or Urban) Schools, which gradually replaced the District Schools from 1872-1902?[134]

The establishment of the "Teachers Institute" aimed specifically to satisfy demands for qualified teachers at the upper elementary levels. It is first mentioned in connection with the 1872 Statute for

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[133] Figures for 1870 (137), 1875 (137), 1881 (137), 1895 (237), 1904 (237), and 1913 (237) compiled from data in Hans, op. cit.,pp. indicated in parentheses; 1910 and 1916 from Johnson, op. cit., p. 215.

[134] Cf. p. 32. Recall that Municipal Schools were themselves transformed into Higher Elementary Schools from 1912-1915.

Municipal Schools, which provided for the transformation of District Schools into Municipal Schools. Not only did this statute specify an improved elementary school curriculum, but it also outlined higher prerequisites for teachers of the new Municipal Schools. "Persons who have successfully *completed the full course of study in a teachers institute*, *or* who have *passed complete examinations at such an institute in theoretical scientific subjects* [italics mine] as well as ability to teach in city schools, may become teachers or assistant teachers in city schools."[135] In accordance with this directive, Teachers Institutes had a "strongly pronounced universal professional-pedagogical character."[136] That is, emphasis was placed on the ability both to know the general theoretical subjects, which, as already indicated, dominated the Municipal School curriculum,[137] and to be able to teach them. As to the accomplishment of these tasks, they purportedly "gave a fundamental pedagogical preparation, but the level of scientific preparation was low."[138]

Inasmuch as its pupils were required not only to have completed all six grades of the Municipal School, but also to remain there for an additional year of study,[139] graduates of the three-year course of Teachers Institutes academically were much better prepared than those of the Teachers Seminaries. Nonetheless, the Teachers Institutes, while an improvement over the Seminaries, were slow in becoming an integral part of teacher preparation in Imperial Russia. Whereas in 1910 there were only 15 of them enrolling 1041 students, their growth accelerated to 20 in 1912, 48 in 1916, and 58, with an enrollment of 4000, in 1917.[140] Although the length of study (including prior preparation) and curriculum of the Teachers Institute were equivalent to those of the Gymnasia, they were "far below higher schools, in which, incidentally speaking, graduates of teachers institutes did not have the privilege of entering."[141] Graduates of Teachers Institutes, who were prepared solely to be teachers of Municipal Schools and of Higher Elementary Schools (after 1912), were much more restricted in terms of occupational goals than those in even the Real Gymnasia prior to 1915,[142] who at least had the opportunity to continue their studies in non-university higher educational institutions, which, while narrowly utilitarian, constituted a technically diversified network.

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[135] Johnson, *op. cit*., p. 167.

[136] "Uchitel'ckie instituty" ["Teachers Institutes"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II, 548.

[137] *Supra*, p. 33 (Table 2 containing Municipal School Curriculum).

[138] "Pedagogicheskoe obrazovanie" ["Pedagogical Education"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II, 110.

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[139] Hans, _op. cit_., p. 126.

[140] Johnson, _op. cit_., p. 215.

[141] A. P. Pinkevich, "Pedagogicheskoe obrazovanie v SSSR" [ "Pedagogical Education in the U.S.S.R." ], _Nauchnyi rabotnik_ [ Scientific Worker ], No. 11 (November, 1927), 87.

[142] Recall that graduates of Real Gymnasia, as of 1915, were allowed to enroll in universities.

The preparation of elementary school teachers in an industrializing society is a paramount task, which in Imperial Russia came to be assumed almost entirely by secondary institutions. While certain schools of the general educational structure, such as the girls' Gymnasia, as well as schools of Church affiliation,[143] participated in this effort, expanding requirements of society had necessitated the establishment of institutions directly addressed to this problem. Teachers Seminaries and Institutes, which initially had been instituted as stopgaps to accommodate a growing and improving level of elementary education, became integral parts of the Imperial education system. Furthermore, by preparing teachers for elementary schools of the general educational structure, they provided a necessary link between the general and vocational/technical structures of education.

### Pre-Revolutionary higher educational institutions

The task of preparing teachers for secondary schools was assumed by higher educational institutions, but was not restricted to the universities alone. We recall that the situation in Russia with regard to the viability of pedagogy as a discipline was particularly critical following the closing of the Main Pedagogical Institute in 1858,[144] since this act led to the closing in 1859 of all Pedagogical Institutes, which at that time were all attached to universities.[145] These Institutes had the task of preparing teachers for the Gymnasia and

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[143] "Pedagogicheskoe obrazovanie," loc. cit.

[144] Supra , pp. 55-56.

[145] "Pedagogicheskie instituty pri universitetakh" /Pedagogical Institutes attached to Universities"/, Pedagogicheskii slovar' /Pedagogical Dictionary/, Vol. II, 106.

District Schools. Their functions were to be assumed by Pedagogical Courses at the universities - the way for such courses having already been somewhat prepared with the establishment of special Chairs of Pedagogy in all universities in 1850.[146] The professors appointed to these Chairs of Pedagogy, which were established in the Historico-Philological Faculties, were responsible for giving lectures on pedagogy. The attendance of these lectures was required of all students aspiring to teach in Gymnasia and District Schools, regardless of whatever faculty they were enrolled in (including those in Physico-Mathematical Faculties).[147] These Pedagogical Courses, in the strict sense of the term, owe their official beginning to the decree of the Ministry of Public Instruction in 1860, which stipulated their establishment in all university towns and specified their aim as "the preparation of worthy teachers particularly for the secondary schools of the Ministry of Public Education [Instruction] as well as for other ministries and administrations."[148] The effectiveness and extent of such Courses, however, is questionable, as is demonstrated by their conspicuous absence in the curricula of the Physico-Mathematical Faculty of prominent Moscow University in 1863.[149] Nonetheless, A. V. Golovnin, Minister of Public Instruction (1862-1866), tried to compensate for the closing of the Pedagogical Institutes in 1859 not only by experimenting with the "Teachers Seminary,"[150] but also by actually setting up Pedagogical Courses as of 1865 in accordance with the decree of 1860.[151] Another source further qualifies these first Pedagogical Courses as being of two types: first, as 4-6 weeks summer courses, which were organized by the government (Ministry of Public Instr7ction), zemstva (elective county councils), the Moscow Society of Women Governesses and Teachers, and other organizations; second, as "stationary pedagogical institutions" [italics mine], such as those established in the university cities of St. Petersburg, Moscow, Kiev, Kharkov, and Kazan.[152] The reference to Pedagogical Courses in the latter sense as "stationary pedagogical institutions" can create confusion. Taken collectively, they simply are year-round institutions, in the sociological sense, formal institutions, which have an independent existence and purpose, and generally their own separate physical facilities.

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[146] *Supra*, p. 55.

[147] Johnson, *op. cit.*, p. 105.

[148] *Ibid.*, p. 163, *quoting* *Sbornik postanovlenii po ministerstvo narodnogo proveshcheniia* [*sic*] [Collection of Decrees of the Ministry of Public Instruction] (St. Petersburg: Imperial Academy of Sciences, 1864-1865), Vol. III, art. I, pp. 460-472.

[149] Cf. p. 61 (Table 7 containing Four-Year Program of Physico-Mathematical Faculty of Moscow University [1863]).

The purpose of these Pedagogical Courses primarily was to prepare teachers for the secondary schools of the Ministry of Public Instruction. They consisted of two years of instruction, and students, generally university students seeking to qualify themselves as secondary school teachers, could major in one of the following areas:

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[150] Supra , p. 83.

[151] Johnson, op. cit., p. 170. According to Hans, op. cit., p. 137, 12 Pedagogical Courses were set up by 1870.

[152] "Pedagogicheskie kursy" ["Pedagogical Courses"], Pedagogicheskii slovar' [Pedagogical Dictionary], Vol. II, 106. For a specific listing of the most important Pedagogical Courses, together with certain of their features, infra, pp. 96-100 (Table 15).

mathematical sciences; Divine Law with Greek and Hebrew languages; Latin and Greek; German and Latin; historical sciences; Russian language, literature, and history; and science subjects for the lower educational levels.[153]

While twelve Pedagogical Courses existed by 1870, they were completely abolished in 1871 by Count Tolstoi, Minister of Public Instruction (1866-1880). However, some of the most important Pedagogical Courses had their beginnings shortly after this. In 1872 there were established the Froebelian Courses in Petersburg, Higher Women's Courses of Governesses and Teachers in Moscow, and the higher Women's Courses of Professor V. I. Ger'e in Moscow, which led to the opening of Higher Women's Courses in Kazan (1876) and Kiev (1878), while the Bestuzhev Courses arose in Petersburg in 1878.[154] Beginning with the period of reaction in 1886, their enrollments were reduced and they were soon closed. The reason for the tsarist government's suspicion of _strictly pedagogical institutions_, whether they be _Pedagogical Courses_, as above, or _Pedagogical Institutes_, both of which reappeared and rapidly multiplied only after the turn of the century, was that it feared "the dissemination of revolutionary sentiments among the students - who were to be future public teachers."[155] As a result of the trend toward their restoration at the turn of the century, the number of Pedagogical Courses reached 150 by 1915 - the length of such Courses varying between one-three years.[156] Under conditions of rapid industrial expansion, inordinate demands made upon the established educational system necessitated resorting to such institutions to supplement ones deemed to be unable to cope with certain new contingencies. Such action characterized Imperial Russia in its final years.

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[153] _Ibid_.

[154] _Infra_,pp.100-1 (for bibliographic references corresponding to each of the Courses mentioned), footnote # 163.

[155] "Pedagogicheskoe obrazovanie," _loc. cit_.

It would not appear pedagogically sound to expect that the increased use of Pedagogical Courses at the higher educational levels alone would satisfy the increased educational needs of an industrializing society. Rapid technical and industrial growth made the need for greater sophistication in the teaching of mathematics and scientific disciplines inevitable. Pedagogical Courses are seen to have never taken a firm hold in the universities, whose physico-mathematical and historico-philological faculties were almost the exclusive source of secondary teachers. One Soviet historian of higher education asserts that students of the universities received knowledge in the area of psychology of growth, but that work in pedagogy generally, and methods of teaching given academic disciplines particularly, were entirely absent.[157] The complete revision of the secondary school curricula in 1916[158] was a manifestation of concern not just for more, but for better prepared secondary school graduates. Preceding this was a recognition of the deficiencies of State universities in the area of pedagogical preparation of secondary school teachers. The result was the establishment of special higher Pedagogical Institutes.

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[156] Johnson, op. cit., p. 215.

[157] N. I. Cheliapov, "Set' vysshikh uchebnykh zavedenii v RSFSR za desiat' let" /"The Network of Higher Educational Institutions in the RSFSR for Ten Years"/, Nauchnyi rabotnik /Scientific Worker/, No. 11 (November, 1927), 75.

A similar assertion is made in an article by the same author in "K voprosu o metodakh prepodavaniia v vysshei shkole" /"On the Problem of Methods of Teaching in the Higher School"/, Nauchnyi rabotnik /Scientific Worker/, No. 7-8 (July-August, 1927), 20, where he states that "the fact of his graduating from the physico-mathematical faculty already, so to speak, 'converted' him into a pedagogue, although such a pedagogue did not understand anything in pedagogy."

[158] Supra, Table 5, p. 42 (for Secondary School Curricula Under the Ignatiev Plan / 1916 / ).

Thus, in addition to the resurgence of Pedagogical Courses in the last years of the Imperial regime, there is also a re-emergence of institutions similar in their functions to the former Pedagogical Institutes, which had been attached to the universities and whose demise dated from 1859, as already indicated. While the original Pedagogical Institutes formed a part of the State network of education, those established shortly before the "Imperialist War of 1914" were privately financed.[159]

Of the 56 higher educational institutions of the technical/vocational structure in 1914-1915,[160] the number of strictly pedagogical institutions, including both Pedagogical Institutes and Courses, represented a respectable 18%, although they accounted for only 5.6% of the total enrollment. These percentages are obtained from the following breakdown of higher technical/vocational institutions:

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[159] These Pedagogical Institutes specifically were: Froebelian Women's Pedagogical Institute (Kiev), Women's Pedagogical Institute (Petersburg), Pedagogical Academy (Petersburg), and the Pedagogical Institute named P. G. Shelaputin (Moscow). The Historico-Philological Institutes (Petersburg & Nizhni), although classified as Pedagogical Institutes in 1914-1915 (infra Table 15 on p. 96 ), were State supported institutions founded much earlier.

[160] Supra, p. 77 (Table 10 containing Comparison of General Educational and Vocational/Technical Structures of Imperial Education, 1914/1915).

## TABLE 14

## HIGHER EDUCATIONAL INSTITUTIONS OF THE VOCATIONAL/TECHNICAL STRUCTURE OF IMPERIAL RUSSIA, 1914-1915[161]

| Type of Institution | Medical | Pedagogical | Agricultural | Technical & Transport. | Economic | Musical & Theatrical | Total |
|---|---|---|---|---|---|---|---|
| No. Institutions | 9 | 10 | 10 | 14 | 6 | 7 | 56 |
| Enrollment (in thousands) | 7.5 | 3.3 | 6.7 | 21.2 | 12.7 | 7.2 | 58.6 |

The Pedagogicheskaia entsiklopediia (Pedagogical Encyclopedia) and various other primary and secondary sources used in this study do not identify further the ten special pedagogical institutions accounted for in Table 14 above. The fact of the matter is that only the Pedagogicheskii slovar' (Pedagogical Dictionary) makes any attempt to identify them at all.[162] Having identified these ten pedagogical higher institutions, because of their significance in the development of pedagogy at the higher educational levels in Imperial Russia, they are described in greater detail below:

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[161] "Vysshee professional'no-tekhnicheskoe obrazovanie" /Higher Professional-Technical Education" _7, Pedagogicheskaia entsiklopediia /Pedagogical Encyclopedia_7, Vol. III (1930), 265-266.

[162] Eight of the ten pedagogical institutions accounted for in Table 15 were mentioned under the following topical headings of the Pedagogicheskii slovar', Vol. II:
"Pedagogicheskoe obrazovanie" ("Pedagogical Education"), 110.
"Pedagogicheskie instituty" ("Pedagogical Institutes"), 105.
The remaining two institutions, the Higher Women's Courses of Professor V. I. Ger'e and the Bestuzhev Courses, were located by vertical and cross-reference analyses of the eight known institutions.

## TABLE 15

## SPECIAL HIGH PEDAGOGICAL INSTITUTIONS IN IMPERIAL RUSSIA, 1914-15

| Inst. No. | Institution (Location) | Classification | Founded | Course Length Yrs. | Mathimatics Significant? | Organization (Remarks) | Purpose of Institution | Transformed to (in Soviet period) |
|---|---|---|---|---|---|---|---|---|
| 1 | Historico-philological Institute (Petersburg) | I | 1867 | | No | | Prepare teachers of secondary institutions. | |
| 2 | Historico-philological Institute (Nizhni) | I | | | No | | | |
| 3 | Froebelian Courses (Petersburg) | C | 1872 --<br>1878 --<br>1907 -- | 1<br>2<br>3 | No | | Preparation of teachers for elem. & lower secondary grades. | Institute of Pre-School Education. |
| 4 | Higher Women's Courses of Governesses and Teachers (Moscow) | C-W | 1872 | | No | Later called Tikhomirov courses in honor of D. I. Tikhomirov. | | Women rec'd full equality with men in higher ed., hence, higher Women's Courses abolished. |

TABLE 15 - Continued

| Inst. No. | Institution (Location) | Classification | Founded | Course Length Yrs. | Mathimatics Significant? | Organization (Remarks) | Purpose of Institution | Transformed to (in Soviet period) |
|---|---|---|---|---|---|---|---|---|
| 5 | Froebelian Women's Pedagogical Institute (Kiev) | I-W | 1908 | | No | Pedagogical & psychological laboratories and kindergartens for practical studies attached to Institute. | Preparation of workers in pre-school training. | Institute of Public Education. |
| 6 | Higher Women's Courses of Professor V. I. Ger'e (Moscow) | C-W | 1872 --<br>1879 --<br>(later)-- | 2<br>3<br>4 | Yes | Two faculties: historico-mathematical and historico-philological. Served as model for Higher Women's Courses in Kazon (1876) and in Kiev (1878). | Give girl graduates of gymnasium or institute opportunity to continue education. | Women rec'd full equality with men in higher education, hence, Higher Women's Courses were abolished. |
| 7 | Women's Pedagogical Institute (Petersburg) | I-W | 1903 (on basis of Higher Women's Ped.Courses which arose in 1863. | 4 1/2 | Yes | Two departments: Physico-mathematical and philological-historical. Said to be analogous to Bestuzhev and Tikhomirov Courses. | Preparation of women for educational-training work in the secondary school. | I Petrograd Pedagogical Institute, then merged with Pedagog. Institute named A.I. Gertsen. No div. bet. men's and women's institutions. |

TABLE 15 - Continued

| Inst. No. | Institution (Location) | Classification | Founded | Course Length Yrs. | Mathimatics Significant? | Organization (Remarks) | Purpose of Institution | Transformed to (in Soviet period) |
|---|---|---|---|---|---|---|---|---|
| 8 | Pedagogical Academy (Petersburg) | C | 1907 | 2 | Yes | Students studied pedagogical psychology, history of pedagogy, school administration, introduction to pedagogy (sur- of contempor- ped.problems). Special preparation in work on methods of subjects of general education school. S.I.Shokhor-Trotskii, eminent mathematics methodoligist taught here. | Give special scientific preparation to future leaders of public education and teachers of the secondary school, who clearly had a higher educational preparation. Although supported by private funds, it was under jurisdiction of Ministry of Public Instruction. | Closed 1915 due to lack of funds. |

TABLE 15 - Continued

| Inst. No. | Institution (Location) | Classification | Founded | Course Length Yrs. | Mathimatics Significant? | Organization (Remarks) | Purpose of Institution | Transformed to (in Soviet period) |
|---|---|---|---|---|---|---|---|---|
| 9 | Bestuzhev Courses (Petersburg) | C-W | 1878 | 4 | Yes | Courses had historico-philological, physico-mathematical, and juridical faculties. | Prepare women to teach all classes of girls' secondary educational institutions and the four lower classes of the male secondary school. Women with secondary education accepted. | |
| 10 | Pedagogical Institute named P.G. Shelaputin (Moscow) | I | 1911 | 2 | Yes | Students received fundamental ped. and methodological preparatory, including theory and history of pedagogy, logic and psychology. | Prepared persons with a high education for pedagogical work. | Academy of Social Training, which later became the Academy of Communistic Training named N.K. Krupskaia. |

TABLE 15 - Continued

| Inst. No. | Institution (Location) | Classification | Founded | Course Length Yrs. | Mathimatics Significant? | Organization (Remarks) | Purpose of Institution | Transformed to (in Soviet period) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Special and methodological preparation carried out in mathematics, physics, cosmography, language, and history. Best pedagogical institutions in Imperial Russia. | | |

Classification legend: I - Institute C - Course W - Women's

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[163] The data for institutions 1-10 in Table 15 was compiled from the following sources (numbers corresponding to number identifying given institution in table):

1 & 2 "Pedagogicheskoe obrazovanie" ["Pedagogical education"], Pedagogicheski slovar' [Pedagogical Dictionary], Vol. II, 110. "Pedogogicheskie institute" ["Pedagogical Institute"], Ped. slovar' [Ped. Dictionary], Vol. II, 105.

3 "Frebelevskie kursy" ["Froebelian Courses"], Pedagogicheskii slovar' [Pedagogical Dictionary], Vol. II, 610.

4 "Pedagogicheskie kursy" ["Pedagogical courses"], Pedagogicheskii slovar' [Pedagogical Dictionary], Vol. II, 106.

5 "Frebelevskii zhenskii pedagogicheskii institut" ["Froebelion Women's Pedagogical Institute"], Pedagogicheskii slovar' [Ped. Dictionary], Vol. II, 611.

6 "Vysshie zhenskie kursy professora V. I. Ger'e v Moskve" ["Higher Women's Courses of Professor V. I. Ger'e in Moscow"], Pedagogicheskii slovar' [Ped. Dictionary]. Vol. I, 220.

"Vysshie zhenskie kursy" ["Higher Women's Courses"], Pedagogicheskii slovar' [Ped. Dictionary], Vol. I, 220.

As indicated in Table 15, half of the institutions (#6-#10) are estimated to be significantly involved with the pedagogical aspects of mathematics. Admittedly, the total enrollment of all ten special pedagogical institutions, let alone that of those having notable relevance to mathematics pedagogy, accounted for only a small percentage of higher educational enrollments as a whole. However, the fact that there were such higher institutions predicated on pedagogy generally, and as related to mathematics specifically, is significant. It moderates the common supposition that secondary school teachers, the overwhelming majority of whom were prepared in universities, which virtually omitted pedagogical training, had no choice but to be oblivious of pedagogy, especially of its ramifications for the teaching of mathematics. Pedagogy no longer was confined only to the minds of intellectuals, especially of the eminent mathematics pedagogues of the 1870's through the 1890's. It gradually emerged from this vacuum, first, beginning

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[7] "Zhenskie pedagogicheskie instituty" ["Women's Pedagogical Institutes"], Pedagogicheskii slovar' [Ped. Dictionary], Vol. I, 373.

[8] "Pedagogicheskaia akademiia" ["Pedagogical Academy"], Pedagogicheskii slovar' [Ped. Dictionary], Vol. II, 103.

[9] "Bestuzhevskie kursy" ["Bestuzhev Courses"], Pedagogicheskii slovar' [Ped. Dictionary], Vol. I, 93.

[10] "Pedagogicheskii institut imeni P. G. Shelaputina" ["Pedagogical Institute named P. G. Shelaputin" ], Pedagogicheskii slovar' [Ped. Dictionary ], Vol. II, 108.

in the 1860's, in the form of secondary educational institutions, such as the Teachers Seminary and the Teachers Institute, and then, mostly after the turn of the century, in pedagogical higher educational institutions--namely, Pedagogical Courses and Pedagogical Institutes. Teachers no longer were bound to remain ignorant of methodological factors facilitating the teaching of their given subjects. The institutionalization of pedagogical processes, however, had only reached an embryonic stage of development. The levels of development required for Russian social and cultural advances comparable to Western European societies was problematical and highly dependent on decisions taken by the new Soviet regime in the area of pedagogy in general, and of mathematics and science pedagogy in particular.

# CHAPTER III

# ECONOMIC AND PHILOSOPHICAL FOUNDATIONS OF SOVIET EDUCATION POLICY

> Thou art wretched, thou are abundant,
> Thou art mighty, thou are impotent -
> Mother Russia![1]
>
> This is a peculiar epoch, or rather
> stage of development, and in order to
> utterly defeat capital, we must be
> able to adapt the forms of our struggle
> to the peculiar conditions of this stage.[2]

It has been suggested by some, perhaps in a biased vein, that educational systems and educational policies are among the best barometers of the character of a nation and its government--even more so than such obvious parameters as economic organization, political framework, and military structure.[3] Early Soviet Russia appears appropriate for such an analysis for two reasons: first, a reason that will be elaborated in the subsequent analysis, the Soviet educational system "faithfully reflects the two historical currents of Russian evolution--the democratic and the autocratic;"[4] second, the organization of education in early Soviet Russia preceded the systematic reorganization of all aspects of society, and particularly, those of the political and economic domains. Hence, an understanding of the evolution of educational policy, specifically in the area of mathematics instruction, is one approach to an understanding of Soviet society generally.

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[1] Lines from N. A. Nekrasov's poem Who Lives Happily in Russia? quoted in Vladimir I. Lenin, Selected Works, Vol. II (Moscow: Foreign Languages Publishing House, 1952), p. 442.

[2] Ibid., p. 458.

[3] This notion is espoused, for example, by Sergius Hessen and Nicholas A. Hans in Educational Policy in Soviet Russia (London: P. S. King & Son, Ltd., 1930), p. XXI. More recent works by methodologists such as C. A. Anderson, G. Z. F. Bereday, P. Coombs, F. Harbison, G. E. Jensen, W. K. Medlin, R. Merritt (with S. Rokkan), M. Debeauvais (at OECD), and others have made new contributions to the question of comparative method and educational indicators.

[4] Ibid., pp. XXI-XXII.

While the Marxian theory of social change and revolution is generally well known, in order to provide a rationale for the actions taken by Soviet educational policy-makers in establishing major educational objectives for the new regime and to show the complexities prompting the uniqueness of such actions, it is necessary to review the Soviet philosophical conception of revolution. This conception derives principally from the writings of Karl Marx (1818-1883), German founder of modern socialism and communism, and V. I. Lenin, leader of the most radical Russian revolutionary movement.

Any revolution necessarily involves economic and social transformations. The concept of "revolution" itself implies a struggle between two factions for control of the political system, which controls the nature of the society and its concomitant economic organization. Marxist literature characterizes these factions as the "dominant class" and the "revolutionary class." What precipitates the development of this "revolutionary class"? Marx rested his case heavily on the economic determinants within any society--around economics everything else revolved.

Such a viewpoint is predicated on the materialist conception of history, which Marx's close literary associate, Friedrich Engels (1820-1895), characterizes as follows:

> The materialist conception of history starts from the proposition that the production of the means to support human life and, next to production, the exchange of things produced, is the basis of all social structure; that in every society that has appeared in history, the manner in which wealth is distributed and society divided into classes or orders is dependent upon what is produced, how it is produced, and how the products are exchanged. From this point of view the final causes of all social changes and political revolutions are to be sought, not in men's brains, not in man's better insight into eternal truth and justice, but in changes in the modes of production and exchange. They are to be sought not in the philosophy, but in the economics of each particular epoch.[5]

Accordingly, technical progress and attendant social changes result in the obsolescence of the existing economic organization of the society, and those who stand to gain from a changed organization of the economy, that is, who have their own "class" interest vested in such a change, come to assume the role of antagonists--collectively speaking, the "revolutionary class."[6]

Marx foresaw two major revolutions in any developing society: the first consists in the transformation of the feudal economy into an industrialized craft, or capitalist, economy; the second consists in the transformation of the capitalist economy into a socialist economy.

In the first of these revolutions, the bourgeois entrepreneurs displace the old feudal aristocracy because such industrialization helps to secure national wealth and power. But the now dominant, revolutionary, entrepreneurial class, as the feudal aristocratic class before it, once it succeeds in bringing about the economic transformation upon which its revolutionary activities and subsequent control of the State were predicated, resists further economic transformation. In striving to maintain the status quo, it exploits the factory workers, or the working proletariat, who are increasing in numbers proportionate to the rapid expansion of industry. The power of the bourgeoisie resides in their ownership of the means of production, which results in its appropriation of the "surplus product" for its own financial self-aggrandizement. Since the bourgeoisie control the State, their rights are protected by the same.

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[5] Friedrich Engels, "Socialism: Utopian and Scientific," Essential Works of Marxism, ed. Arthur P. Mendel (New York: Bantam Books, 1961), p. 64.

[6] Robert A. Solo, Economic Organizations and Social Systems (Indianapolis: The Bobbs-Merrill Company, Inc., 1967), pp. 394-95.

The seeds of the second revolution are planted when the proletariat becomes cognizant of the added profits that could be theirs if they received the full fruits of their labors. This phenomenon could come about only if the proletariat themselves controlled the State, where State planning of the economy and ownership of the means of production would replace private responsibility for and investment in the economy by the bourgeois capitalists. This common consciousness of the proletariat unites them into the new revolutionary class. The so-called "contradictions of capitalism"[7] and the overwhelming preponderance in relative numbers assure the victory of the proletariat over bourgeoisie, of socialism over capitalism.[8] This victory results in Marx's "dictatorship of the proletariat,"[9] which Lenin describes as "the continuation of the class struggle of the proletariat in new forms."[10] Thereafter, since all persons would be workers, the dialectical conflict between a dominant class and a revolutionary class would disappear, and the State no longer would function as an instrument of the interests of the dominant class.

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[7] These contradictions include inequalities of wealth (resulting in an alarming "disparity between the capacity to produce and the propensity to consume" /_Ibid_., p. 395_/ ), rise in unemployment, imperialist wars (which are fomented in the process of locating new markets, and thus, to exploit colonial people in an attempt to find an outlet for produced goods--thereby escaping the ravages of large-scale unemployment), and discords between production and consumption, due to lack of rational centralized control of the economy.

Thus, the implications, or prerequisites, according to Marx's philosophy of dialectical materialism,for the organization of a revolution to overthrow the tsarist regime and to establish socialism (and eventually communism) were: 1) the socialist transformation of society could only take place following an industrial revolution by the capitalistic bourgeoisie; 2) there existed a proletariat having a consciousness of its class interest, and organized sufficiently to gain control of the State apparatus; 3) the necessity that the established capitalist, industrialized economy be in an advanced stage, such that its "contradictions" posed a real threat against which the preponderant proletariat could be rallied to seek redress; 4) the proletariat, as a whole, has an interest in material gain (i.e., an equitable distribution of the "surplus product"); 5) the existence of a substantial group of individuals with technical know-how to carry on the work of bourgeois technicians in the industrialized society. Nonetheless, the actual conditions of the Russian society, as it existed just prior to the revolutions of 1917,[11] in almost no way fit the mold for the revolutionary achievement of socialism, which had been described by Marx.

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[8] As the following statement of Marx indicates, he did not discount support from certain elements of the dominant bourgeois class, an essential ingredient for the success of the revolution by the proletariat:

> Finally, in times when the class-struggle nears the decisive hour, the process of dissolution going on within the ruling class, in fact, within the whole range of old society, assumes such a violent, glaring character, that a small section of the ruling class cuts itself adrift, and joins the revolutionary class, the class that holds the future in its hands. Just as, therefore, at an earlier period, a section of the nobility went over to the bourgeoisie, so now a portion of the bourgeoisie goes over to the proletariat, and in particular, a portion of the bourgeois ideologists, who have raised themselves to the level of comprehending theoretically the historical movements as a whole.
>
> Karl Marx and Friedrich Engels, The Communist Manifesto (New York: Monthly Review Press, 1964), p. 20.

[9] Marx explains this term in his Critique of the Gotha Program: ". . .Between capitalist and communist society lies the period of the revolutionary transformation of the one into the other. There corresponds to this also a political transition period in which the state can be nothing but the revolutionary dictatorship of the proletariat. . ." Quoted in Vladimir I. Lenin, "State and Revolution," Essential Works of Marxism, ed. Arthur P. Mendel (New York: Bantam Books, 1961), p. 169.

[10] Vladimir I. Lenin, Collected Works [Socineniia], Vol. 30 (London: Lawrence and Wishart, 1960), pp. 95-96.

This unreadiness of Russian society for the transformation to socialism, according to Marxist dialectics, lay basically in the fact that it had not yet undergone a comprehensive period of industrialization. While the Industrial Revolution reached Russia at the end of the nineteenth century[12] and production outputs accelerated rapidly,[13] by World War I there was still a relative dearth of heavy machinery and capital goods, the abundance of which are essential trademarks of a truly industrialized society. This circumstance, in turn, was attributable to the fact that Russian society had not even experienced the first revolutionary transformation of society in which the feudal aristocracy, who were empowered through land inheritance, was to have been displaced by bourgeois industrialists. The bourgeoisie of Western Europe, by competing for centuries with the feudal aristocracy and by reshaping and industrializing society, had profited from its experience. Independent self-assertion and experience in the establishment of industrial concentrations, which came to be scattered throughout the European continent by the eighteenth century, had as its natural outgrowth a pattern of self-government. In stark contrast, however, stood Russia, whose highly dispersed concentrations up to the last decades of the nineteenth century consisted mainly of forts, fur-trading outposts, and administrative arms of the autocratic State. Having only undergone the embryonic stages of the Industrial Revolution, twentieth-century Russia even then could not claim to have fostered a revolutionary bourgeoisie, who had provided the leadership for its industrialization. Responsibility for industrialization, incomplete though it was, belonged to the State, which had looked upon industrialization as its "single alternative" in securing itself against a hastily modernizing Europe.

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[11] There were two revolutions in Russia in 1917: the first revolution in March resulted in the overthrow of the tsarist regime and the establishment of a Provisional Government, which was democratic in form; the second revolution, known as the October Revolution (in accordance with the former Julian calendar, but which occurred in Nov. 12-14 according to the present-day Gregorian calendar), which resulted in the replacement of the Provisional Government with that of the communistic Bolsheviks and led to civil war during the 1917-1919 period. Bernard Pares, A History of Russia (New York: Alfred A. Knopf, 1958), pp. 488 & 494.

[12] Cf. p. 81.

[13] Supra, p. 82 (Table 11 on Production in Major Industries in Imperial Russia [1860-1900]).

Thus, Marx's prerequisites for the transition to socialism lay fettered by the historic backwardness of economic evolution in Russia. Without a mature industrial revolution, his "contradictions" of capitalism never emerged either to unite the working proletariat into a class, conscious of its own interests, or to whet their appetites for material consumer goods with an abundant production output. It would be redundant to elaborate here on the relative dearth of individuals with technical know-how in a society, such as that of late Imperial Russia, which was predominantly agrarian in nature. Marx had provided a rationale for the Bolshevik revolution, but his methodological prescription, inconsistent with the conditions of Russian society, defied implementation.

Notwithstanding the reasonable degree of logic and rationality of Marx's conception of socialist transformation, nonetheless, the socialist revolution achieved in Russia in October 1917 could not be guided by its tenets. While the temptation to castigate Marx for being oblivious to other alternatives for the socialist reconstruction of society looms, it is more reasonable to recognize the uniqueness of the Russian culture and experience. The authority of the State, while fluctuating between periods of liberal reform and reaction, such as indicated in the previous chapter, remained unchallenged in its capacity for leadership. The economic development of Russia was a reflection of this political orientation. From a geographical standpoint, such an orientation of unabated power by the State could be explained as a historical necessity, which was occasioned by the lack of natural barriers and by the great expanse of Russia. Defense against invaders required collective action, which, in turn, could only be triggered by the common recognition of and allegiance to a single authority. Whatever explanation or combination of causes one accepts in accounting for the supremacy of the State, as the final authority in all matters, historical precedent had conditioned immediate response by the Russian people to the slightest stimulus (not infrequently reinforced by punishment or coercion!) of centralized power.

It was Leon Trotsky's deep understanding of Russian culture that enabled him correctly to predict that socialism not only would first succeed in Russia, but also would be brought about by a small minority of the newly born working proletariat of the infant Russian industry, who had been prompted into action by a small group of communist elites. Solo's explanation for this phenomenon likewise is based on characteristics peculiar to Russian culture:

> Since the *centralized power* of the political system stood *in lieu of the interests and initiatives of functional classes*, revolutionary change proceeded *not through class war but through the struggle of ideologies to gain possession of the seat of central power*. (Italics mine.) [14]

The October Revolution of 1917 simply resulted in the transfer of power from one form of central authority to another, that is, from the Tsar to the Communist Party, respectively. Marx's "dictatorship of the proletariat" never even approached fruition, and, in fact, the "dictatorship of the Communist elite" came to dominate as the new central authority.

The preceding pages have concentrated heavily on the analysis of a philosophical social theory, namely, that of Karl Marx, which has been observed to be relatively incompatible with the framework of Imperial Russian society. In retrospect, it is not surprising that its prognosis for the socialist transformation of this society was wrought with disparities and inconsistencies. George Counts, while acknowledging

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[14] Solo, *op. cit.*, p. 402.

Marx's bequeathal of some educational ideas to the Bolsheviks,[15] further asserts that "Marx gave relatively little attention to the development of the theory and practice of education under socialism."[16] Why, therefore, bother to discuss the ideology of Marx at all? In accordance with the objectives of this study, the reasons are fourfold: first, a discussion of Marx's theories points up the need for strict adherence to the doctrine of cultural relativism[17] in seeking to understand any aspect of Russian/Soviet culture and society, including that of educational policy; second, the study of desired goals and consequences implicit in the Marxist concept of socialist revolution, as contrasted with their actual failures to achieve viability in Russian society, helps to identify the cultural system and the needs of that society--two phenomena, which are intrinsic to the formulation of its teleological aims

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[15] The most important of these ideas was the combination of "work with the mind" and "work with the hand," to which Counts attributes the emergence of the idea of "polytechnical education" that became so fashionable in the late 1920's in Soviet secondary education. George S. Counts, The Challenge of Soviet Education (New York: McGraw-Hill Book Company, Inc., 1957), p. 13. Maurice Shore pointed out the basic philosophy of Marx, who studied factory education in England, in his Soviet Education: Its Psychology and Philosophy (New York: Philosophical Library, 1947).

[16] Ibid., p. 12.

[17] "Cultural relativism" is the doctrine in the field of international relations stressing that different reactions to situations and problems by other peoples outside our own society should not be interpreted as stemming from stupidity or maliciousness. It is based on recognition of the fact that "these historically determined patterns of behavior are closely integrated to form a cultural whole which to its bearers justifies and makes reasonable their actions, ideas, and beliefs." Ralph L. Beals and Harry Hoijer, An Introduction to Anthropology (New York: The Macmillan Company, 1959), p. 701.

*of education*;[18] third, an understanding of the Marxist doctrine illustrates the real expectancies associated with the October Revolution, as well as offering a rationale for certain expediencies, which were incorporated afterwards into Soviet educational policy to facilitate the achievement of certain of these expected, but initially unattainable, goals--in short, an understanding of the Marxist doctrine defines the dimensions of the Soviet task, particularly its implications for educational policy; and fourth, a knowledge of orthodox Marxism is mandatory for understanding the need for and the tenets of a revisionist form of Marxism, called Leninism[19]--the actual philosophical ideology that came to serve as the basis of Soviet power and Bolshevism.

What are the foundations of Leninism, which set it in contrast to, and as a redefinition of Marxism? The principal distinction between them is that Leninism stresses the "*unwillingness* [italics mine] to wait patiently for history to carry a feudal, underdeveloped economy with an autocratic government through a prolonged period of bourgeois capitalism and parliamentary government."[20] By what means, then, did Lenin propose to accelerate the process of transformation to a socialist state, that is, to bring about a premature socialist revolution? To begin with, a social-democratic consciousness of their own class interest would have to be conveyed to the workers (including the working proletariat and peasantry) by a select group of socialist intellectual elite. This group would accede to power via two revolutions, as Marx had predicted,[21] but the participants in these revolutions were not the ones that Marx had supposed.[22] Having replaced the victorious proletariat after the second revolution, whom Lenin deemed unprepared, as yet, to assume leadership roles, the revolutionary socialist intelligentsia would guide the Russian nation through the ensuing early stage of capitalism.[23] Lenin's reliance on the support of the peasantry (in addition to the working proletariat, to whom alone Marxian theory was restricted in its designation of the revolutionary class) obviously was based on recognition of the fact that any revolution in a rural, agrarian, and underdeveloped country could not succeed without the support of the most dominant social group, particularly when such a revolution was to be controlled by such a small elite faction. The importance of Lenin's retreat from orthodox Marxism lies not in the "nuts and bolts" of the changes, which he introduced in his doctrine of Leninism, but rather, in the reasons necessitating such a drastic revamping of ideological doctrine--namely, the dilemmas posed by applying Marxism to an industrially and economically underdeveloped society. These dilemmas were not only those posed by orthodox Marxism, that is, the inability of an underdeveloped society to meet Marx's prerequisites for economic development in bringing about a socialist revolution,[24] but also those dilemmas with which even the more appropriate form of Marxism, Leninism, would have to contend.

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[18] Note the relation of the concepts underlined to the "Input phase" of educational policy, as illustrated on the model on p. 2 (Diagram I--Paradigm on the Conduct of Policy in a Centralized Educational System).

[19] This revisionist form of Marxism, also called Lenin's Marxism, was named after Vladimir I. Lenin, the leader of the revolutionary elite of Bolsheviks (Communist Party members). *Lenin's What Is To Be Done?*, published in 1902, was the original work in which he expounded his views on Leninism.

[20] Arthur P. Mendel (ed.), *Essential Works of Marxism* (New York: Bantam Books, 1961), p. 91.

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[21] V. I. Lenin details his concept of two revolutions in Two Tactics of Social-Democracy in the Democratic Revolution (New York: International Publishers, 1935).

[22] Cf. pp.105-106. Lenin acticipated that both revolutions would be led by the urban proletariat, but that supplementary support in each case would be drawn from two separate social classes: in the first, or "bourgeois," revolution, which was to be fought against the feudal landlords and the autocratic state, the wealthier (petty-bourgeois) peasantry was to supplement the urban proletariat; in the second, or "proletarian," revolution, which Lenin foresaw as coming shortly after the first one, the rural proletariat (poor peasantry) would unite with the urban proletariat in overcoming the "private-propertied wealthier peasantry." Mendel, op. cit., p. 95.

[23] This early stage of capitalism, as it turned out, was designated as the period of New Economic Policy (NEP), which lasted approximately from 1921-1927.

The manner in which the Soviet regime resolved these dilemmas was, in turn, reflected in its formulation of educational policy. For example, the Soviet leaders were realistic in displaying apprehension as to how they might avoid continuing Imperial policies, once in power, if they did not have the ready means to create a fully industrialized economy. They were agreed that without such an economy their dreams of socialism would be unfulfilled. Idealism already abounded aplenty with belief in the fact that Russia could advance from an economy that had not progressed far beyond that of the guild/agrarian feudal type, to a premature socialist revolution, and then through a highly accelerated and complete phase of industrialized capitalism--thereby reversing the capitalist-socialist cycles of Marx's pattern of economic revolution! The Bolshevik leadership keyed its dreams to the hope that the Russian socialist revolution would spark a similar revolution in one of the economically advanced countries of Western Europe, especially in Germany, which country could then lend underdeveloped Russia the support necessary to achieve full industrialization. Here, however, a major dilemma confronted the Russian revolutionary elite. A socialist revolution in Germany could only be fomented by economic hardships created by a war on two fronts, i.e., the Soviet regime had to sustain an appreciable military campaign against the German government. This course of action would contradict the Bolshevik prerevolutionary promise to disengage from the war. It was this aspect of the Bolshevik platform that had stood in contrast to the policies of both the Imperial and Provisional Governments, and which Mendel characterizes as the most attractive part of their program.[25] The dilemma, therefore, after the Bolshevik takeover in October 1917, was: either pull out of the war, and thereby sacrifice socialism in Russia, or continue in the war and chance the prospect of losing power altogether as the result of an antiwar revolution. The selection of the first of these alternatives, coupled with internal civil war (1918-1920) and foreign interference, would result in the abandonment of most of the Party's idealistic policies, which had been put into effect shortly after its seizure of power. Hence, the tendency toward a more realistic approach to the formulation of policy, whether it be educational, political, or economic, became evident in Lenin's assessment of the economic situation in April 1918:

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[24] Cf. pp. 107-108.

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[25] Mendel, op. cit., p. 97.

> . . .the art of administration is not innate, but is acquired by experience. . . .Without the guidance of experts in the various fields of knowledge, technology and experience, the transition to socialism will be impossible. . . .And the specialists, because of the whole social environment which made them specialists, are, in the main, inevitably bourgeois. . . .Now we have to resort to the old bourgeois method and to agree to pay a very high price for the 'services' of the top bourgeois experts. . . .Clearly, this measure is a compromise, a departure from the principles of the Paris Commune.[26]

The resolution of the war dilemma, in shelving so many of the Party's doctrinal policies, actually legitimized the dreadful fear of the Party leaders of continuing Imperial policies,[27] since the means to create an industrialized society, as it turned out, were not at the disposal of these leaders of the decreed socialist economy. They were initially forced, therefore, to seek the guidance and services of bourgeois specialists. This circumstance amounted not only to a continuation of Imperial influence, but also to an endorsement of it! If they were ever to rid themselves of the need for such bourgeois elements, they would have to train their own specialists. Under ideal conditions, the new socialist regime could have revamped the whole system of education in accordance with its own ideological dictates, but being pressed by the exigencies of rapid industrialization, it had to compromise many of its original educational goals. Under such an urgent mobilization of educational resources, part of that which existed heretofore would have to be incorporated into the educational process--

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[26] Vladimir I. Lenin, Collected Works /‾Sochineniia_7, Vol. 27 (London: Lawrence & Wishart, 1960), pp. 247-49.

[27] Cf. p. 115.

resulting in an appreciable continuation both of Imperial educational policies and of the utilization of numerous personnel, who were none too sympathetic to the Bolshevik cause.

Continuity with Imperial Russia in the development of a system of Soviet education during roughly the first decade of Soviet modernization (1917-1927) was sustained, therefore, primarily by a forced period of accelerated industrial expansion of the economy (namely, the Leninist version of Marx's "first revolution"[28]), which had to be sponsored and supported by the Soviet Government acting alone. Without any outside support from some socialist nation with an advanced industrialized economy, the revolutionary socialist regime could not survive on a socialist-oriented economy lacking an adequate industrial base. Lenin openly acknowledged this fact in 1921, four years after the October Revolution, when he characterized the Soviet economy--past and future--as follows:

> Borne along on the crest of the wave of enthusiasm. . . we reckoned that by directly relying on this enthusiasm we would be able to accomplish economic tasks just as great as the political and military task we accomplished. We reckoned. . . on being able to organize the state production and the state distribution of products on Communist lines in a small-peasant country directly by an order of the proletariat state. Experience has proved that we were wrong. It appears that a number of transitional stages are necessary--state capitalism and Socialism--in order to prepare--to prepare by many years of effort--for the transition to Communism. . . .we must first set to work in this small-peasant country to build solid gangways to Socialism by way of state capitalism. Otherwise we shall never get to Communism. . . . That is what experience, what the objective course of development of the revolution has taught us.[29]

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[28] Cf. pp. 105-106.

[29] Vladimir I. Lenin, Selected Works, Vol. II, Part 2 (Moscow: Foreign Languages Publishing House, 1952), p. 601.

Ironically enough, however, continuity with Imperial Russia in the development of the system of Soviet education was not restricted to this first decade of Soviet modernization! This tendency remained, and appeared to become more dominant from 1928 on,[30] when Russian modernization appears to have genuinely entered its "second aggressive more thoroughgoing phase"[31] of development. After the

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[30] The key consideration in designating 1928 as the genuine beginning of the "second aggressive more thoroughgoing phase of Russian modernization" is that the adoption of the First Five-Year Plan in 1928 marks the first endeavor of the Soviet Government consciously to direct and to plan all facets of the Soviet economy. Cyril E. Black supports this argument from a methodological standpoint:

> By contrast with 1917, 1928 is the dramatic turning point in the Communist program to modernize Russia. The inauguration of the five-year plans, and the use of the vast power at the disposal of the government to mobilize the resources of the country in the drive for industrialization, produced social consequences out of all proportion to those of the political revolution in 1917. . . .At the same time, it is from 1928 that one must date the *purposeful and thoroughgoing totalitarian methods which today characterize the Soviet pattern of social change*. (Italics mine.) Cyril E. Black (ed.), "The Modernization of Russian Society," *The Transformation of Russian Society* (Cambridge: Harvard University Press, 1960), p. 678.

Such aggressive and totalitarian methods were not peculiar just to the system of economics in the overall pattern of social change, but also assumed new significance, as of 1928, in the system of education, particularly in higher education. For example, P. S. Aleksandrov, in pointing out that 1928, the first year of the five-year plans, marked the turning point in the creation of the professorate and scientific workers, stated that this turning point "did not take place in an unorganized manner, on account of the decisive struggle of the communist party for the implementation of the Lenin instructions on specialists. The university cell of VARNITSO / All-Union Association of Workers of Science and Engineering for Assistance to Socialist Construction /, created in 1928, played a great role in bringing about this turning point." P. S. Aleksandrov, *et al.* (eds.), *Istoriia Moskovskogo universiteta* / History of Moscow University /, Vol. II (Moscow: Izd. Moskovskogo universiteta, 1955), p. 112.

Similarly, another indication of the beginning of a more aggressive phase in Soviet education as of 1928 and the period of the late twenties, characterized by Widmayer as the "re-awakening of the revolutionary mood" (Ruth Widmayer, "The Communist Party and the Soviet School--1917-1937" / unpublished Ph.D. dissertation, Department of Government, Radcliffe College, Harvard University, 1954 /, p. 300.), was the popularity and practice of *socialist competition* in higher educational institutions. The prevalence of this practice simultaneously in education and in industry serves to underscore the close connection between the development of education and that of industry in an economically underdeveloped country.

[31] *Supra*, p. 3.

Left extremist element of Trotsky had been driven out of the Party,[32] the second decade of modernization opened with the undisputed acceptance of the teleological approach to economic development, which was advocated by the Center element with Joseph Stalin at its head.[33] In essence, this approach rejected the economic determinism of Bukharin's Rightist group in toto by subscribing to a different kind of lawfulness of events--one which was "consciously organized and directed by man."[34] While heavy industry had undergone substantial development during the NEP period, only with the advent of Stalin's five-year plans, which were the practical manifestation of the teleological approach to economic development, did the achievement of long-range economic objectives via highly centralized planning become the sine qua non of the Soviet economy. The effect of this economic philosophy on formulating educational policy was monumental, since it advocated accelerating the pace of industrialization at the expense of the availability of consumer goods and services to an already wanting citizenry.[35] The preparation of technical and scientific cadres had to serve as the vanguard of such an economic acceleration.

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[32] Leon Trotsky was expelled from the Communist Party in July 1927. (Pares, op. cit., p. 519.) He maintained that, although it would first succeed in Russia (cf. p. 111 ), socialism (and hence, communism) could not be maintained in Russia without the support of a world victory of socialism in highly industrialized Western Europe.

[33] Following the defeat of Trotsky's Leftist faction, this approach to economic development emerged victorious over the "genetic" approach of Bukharin's Rightist group, which stressed that industrialization could only proceed at a pace commensurate with the lawful tendencies inherent in the existing pattern of economic development. The Rightist viewpoint, therefore, was predicated on the static mechanistic conception of change in which forces within society itself precipitate change spontaneously--i.e., economic development could not effectively be planned. For a thorough discussion of this debate in the late-twenties over economic planning, see Nicholas Spulber, Soviet Strategy for Economic Growth (Bloomington: University of Indiana Press, 1964).

[34] Raymond A. Bauer, The New Man in Soviet Psychology (Cambridge: Harvard University Press, 1959), p. 23.

However, the assertion that continuity with pre-Revolutionary educational policy was more prevalent in this second decade of Soviet modernization than that of the first is not quite so obvious. Its justification proceeds from the fact that the intensity of the economic acceleration, following the inception of the First Five-Year Plan and the concomitant response that it evoked in the already overtaxed educational system, precipitated a new dilemma and revived another one--both pertaining to educational policy: the dilemma of quantity versus quality in the preparation of scientific cadres, and the dilemma of realism versus classicism in relation both to the system of cognition and to methodological practices underlying such preparation, respectively.

The solutions of these two dilemmas were inextricably related, and the nature of this relationship determined the degree of continuity with Imperial educational policy. Specifically, the dilemma of quantity versus quality in the preparation of scientific cadres stemmed from the skyrocketing of economic demands, which were made by the First

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[35] The mechanistic ideal of preserving the economic equilibrium, which tended to prevail during the New Economic Policy (1921-1927), was to be sacrificed for long-range economic objectives. However, NEP had generally accomplished its purpose, which was "to allow the peasants to produce and sell their goods freely, and to return the bulk of light industries to private ownership in order to get more consumers' goods into the market and thereby satisfy the peasants and stimulate agriculture production" (Mendel, op. cit., p. 99.)--thereby assuaging the discontent of the peasants, who were recovering from the famine of 1921, and, in the final analysis, saving the socialist revolution in Russia.

Five-Year Plan (1928). This forced the outputs of educational institutions, particularly those of the secondary and higher levels, to unprecedented heights in order to maintain a reasonable correlation between the need for and supply of trained scientific personnel.[36] Quantitative gains in the output of scientific personnel notwithstanding, beginning with 1929 and steadily gaining momentum up to its official recognition

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[36] A vertical comparison of increases in selected categories of the Soviet intelligentsia suggests that attempts at supplying key scientific personnel met reasonable success:

TABLE 16

OCCUPATIONAL DYNAMICS OF THE SOVIET INTELLIGENTSIA, 1926 vs. 1927
(ALL FIGURES IN THOUSANDS)

| Selected Classifications | 1926 | 1937 | % Increase |
|---|---|---|---|
| Technical-industrial personnel ("engineers," incl. chief & senior engineers, architects, technicians, foremen, etc.) | 225 | 1,060 | 470 |
| Scientific workers (professors, lecturers in higher educational establishments, research workers) | 14 | 80 | 570 |
| Teachers | 381 | 969 | 250 |
| University and college students | 168 | 550 | 330 |

Source: Leopold Labedz, "The Structure of the Soviet Intelligentsia," Daedalus, 89 (Summer 1960), 509.

in resolutions of the Central Committee of the Communist Party in September 1931 and of the Central Executive Committee USSR in September 1932, *quality* of preparation came to replace that of *quantity* of preparation as the principal task of educational policy.[37] Such a reorientation of the principal goal of educational policy could not help but to effect corresponding changes both in the system of cognition and in methodological practices in secondary and higher educational institutions. In turn, the relationship between the defined cognitive system and the methodological practices for its dissemination, as is always the case, determined the type of pedagogical attitude, which came to prevail within the organizational structures at these levels in the Soviet educational system. As indicated earlier, in the Soviet Union, as in Imperial Russia, educational policy tended to fluctuate between two particular pedagogical attitudes--realism and classicism.[38] On the basis of the earlier distinction between these two attitudes,[39] the early

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[37] This transference of emphasis from quantity of preparation to quality of preparation of scientific personnel is evidenced in a sequence of three legislative acts.

1) Emphasis on the "thesis" of *quantity* was legitimized in the resolution of the plenum of the Central Committee VKP (b) [All-Union Communist Party (Bolshevik) ] of 12 July 1928, which stated:

   > Thus, there is present a sharp disparity between the demands for qualified specialists for technically reformed industry and for fully developed capital construction, on the one hand, and the status of the matter of preparation of new cadres of specialists by existing higher technical institutions and technicums, on the other hand. The task of eliminating this contradiction demands a decisive change in the rate and methods of the whole preparation of new cadres of specialists and, in accordance with this, the establishment of an organic connection with production by higher educational institutions and technicums, along with ensuring a significant re-inforcement of their material base. . . . The radical improvement of the matter of preparation of new cadres of specialists is not only the most urgent task of the organs of the People's Commissariat of Education, the economic institutions, and so forth. The trade unions likewise with radical policy must change their own attitudes toward this matter. . . . The preparation of new specialists is the most important task of the whole Party. Nikolai I. Boldyrev (ed.), *Direktivy VKP (b) i postanovleniia sovetskogo pravitel'stva o narodnom obrazovanii; sbornik dokumentov za 1917-1947 gody* [Directives of the All-Union Communist Party and Decrees of the Soviet Government on Public Education; a Collection of Documents for the Years 1917-1947 ], Vol. II (Moscow: Izd-vo Akademii pedagog. nauk RSFSR, 1947), pp. 56-57.

2) The "antithesis" of *quality* of preparation of scientific personnel officially replaced the initial "thesis" of quantity of preparation as the principal task of educational policy at all levels with the promulgation of the following two decrees:

   a) On September 5, 1931, the Central Committee VKP(b) passed a decree concerning the elementary and secondary school, which "sharply turned the attention of the whole Party to questions of quality of school work." (A. Shokin, "K perestroike nachal'noi i srednei shkoly" [ "Toward the Reconstruction of the Elementary and Secondary School" ], *Front nauki i tekhniki* [ The Front of Science and Engineering ], No. 9 (September, 1932), 80.)

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After having noted the large successes made in the construction of schools (quantitative aspect of educational policy), it then noted that "the Soviet school is still far from satisfying those enormous requirements, which are made of it by the contemporary stage of socialist construction. The TsK [Central Committee] considers that the fundamental defect of the school at the given moment consists in the fact that instruction in the school does not give a sufficient volume of general-educational knowledge and unsatisfactorily solves the task of preparation for technicums and the higher school of completely literate people, who possess well the foundations of the sciences (physics, chemistry, mathematics, native language, geography and others)." *Ibid*.

b) On September 19, 1932, the Central Executive Committee USSR passed a decree concerning the educational programs and conditions in the higher school and technicums, which deprecated "the one-sided attention to quantitative growth. . . in the presence of inadequate attention to matters of the quality of academic preparation." Narodnyi komissariat po prosveshcheniia [People's Commissariat of Education], *Gosudarstvennye universitety* [State Universities] (Moscow: ogiz.-izogiz., 1934), p. 96.

[38] Cf. pp. 47-51.

[39] Cf. p. 47. *Realism*, as related to pedagogy, was most often recognized as having carried the connotation of a *utilitarian emphasis based on scientific knowledge*, whereas *classicism* implied a *general education bias based on literary criteria*.

stages of the second decade (as of 1928) of Soviet modernization marked the reversal generally of the dominance of realism in the realism-classicism controversy, so that classicism tended to become the more accepted standard in the educational process. This is to say that, in recognizing the existence of certain exceptions, it would appear that *realism* pervaded the educational policy of the first years of this period, roughly 1928-1930--that is, during the time in which *quantitative considerations* impinged heavily on the preparation of scientific cadres, while the pedagogical attitude of *classicism* appeared to come to the fore when primarily *qualitative considerations* tempered educational policy. This close relationship between classicism and qualitative considerations resulted mainly from a mutual commitment to the concept of general education, as the key to the success of educational policy.[40]

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[40] As examples of this tendency, both in legislative acts and in educational literature, consider:

1) the decree of 5 September 1931 of the Central Committee VKP(b) to equate quality of preparation with preparation that is of the general education type (*supra* part "2) a)" of footnote #37 (p. 124), wherein the fundamental defect of instruction in the "quantitative-oriented" school is cited as being that it "does not give a sufficient volume of general-educational knowledge and unsatisfactorily solves the task of preparation . . . of completely literate people, who possess well the foundations of the sciences (physics, chemistry, mathematics. . .)." Shokin, *loc. cit.*
2) Shpil'rein's criticism of the implementation of the directives, which were issued in 1929 to bring about the reform of higher technical schools: ". . . these directives were insufficiently understood. Instead of trade specialization there arose specialization of all subjects without exception, even of mathematics and physics, and besides along very narrow biases. . . ." Ia. Shpil'rein, "*O kachestve vysshego tekhnicheskogo obrazovaniia v soiuze*" [ "On the Quality of Higher Technical Education in the Union" ], *Front nauki i tekhniki* [ The Front of Science and Techniques ], No. 7-8 (July-August, 1932), 101.

This establishment of the cause-and-effect correspondence of alternatives of the dilemma of quantity versus quality with those of the dilemma of realism versus classicism (i.e., quantity → realism, and quality → classicism), as related to the development of Soviet educational policy, is tantamount to substantiation of the initial assertion that continuity with pre-Revolutionary educational policy was more prevalent in the second decade of Soviet modernization than in the first decade. That is, the ascendant position of quality, and hence, of the classicist pedagogical standard, was manifested in practice by the establishment of general educational programs, with an emphasis on theoretical/general knowledge, in place of the former more utilitarian and specialized ones, which were oriented, for the most part, toward applied knowledge.
Soviet education, although not openly recognized by Soviet educators, therefore, had completed a cycle of sorts and had come to rest at a position approximating the purposes, system of cognition, and methodological practices of the general educational structure of the Imperial system of education! It was only natural that it should draw extensively from the accumulation of experience, primarily in terms of pedagogical materials (textbooks, manuals, teaching devices, general pedagogical literature, etc.) and methodological practices, especially in view of its own inadequate resources at the time. The specific evidence of this continuity is the subject of subsequent chapters.

# CHAPTER IV

## PROVIDING THE FRAMEWORK FOR THE NEW SOVIET SCHOOL (1917-1923)

### Educational policy as a means for socio-cultural change

While Lenin's reformulation of Marx's theory of the socialist transformation of society is an indisputable fact, the two doctrines were in complete agreement as to the basis upon which such change was to be fully predicated--namely, the economics of the society. Lenin understandably was more concerned with the actual mechanics of this process than was Marx, since the October Revolution of 1917 provided a testing ground for his philosophical ideas. Economic problems, which placed the society inherited by the Soviet regime in a deplorable state, provided the principal context within which social change would originate. The regime then had to frame its main objectives for Soviet society within that context. The nexus between the existing economic state of affairs and that to which the Soviet state aspired lay partly in education; the Soviet school was to serve as a prime agent of change in a rapidly industrializing society.

It is somewhat anachronistic that, despite both Marx's rather scanty attention to the development of the theory and practice of education under socialism[1] and Lenin's readiness pragmatically to revise Marxist ideology, Lenin chose to adopt Marx's concept of polytechnical education as the basis for Soviet educational reform. "Polytechnical education," cited previously as the most important of his educational ideas,[2] for Marx constituted one of the three major elements of education.[3] Polytechnical instruction, as defined by him, "inculcates the general principles of all the processes of production and at the same time gives the child or youth practical training in the use of the simplest tools of all industries."[4]

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[1] *Supra*, p. 112. #16

The new framework

The first systematic decree of the Soviet regime on education, promulgated by the All-Russian Central Executive Committee (VTsIK) on 16 October 1918 as the "Regulations for the Unified Labor School of the Russian Socialist Federated Soviet Republic (RSFSR),"[5] emphasized that "the aim of the Labour School is not a drill for some or other craft, but to impart a 'polytechnic' education, giving to children the knowledge of the methods of work."[6] According to Article 1 of the

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[2] Cf. p. 112 (for footnote #15 ).

[3] These elements of education, as contained in a resolution written by Marx for the First Congress of the First International in 1866, were:

1. Intellectual education;
2. Education of the body, similar to that given in schools for gymnastics and military institutions;
3. Polytechnical education.

Albert P. Pinkevich, Science and Education in the U.S.S.R. (London: Victor Gollancz, Ltd., 1935), p. 28.

[4] Karl Marx, cited by ibid.

[5] "Edinaia shkola" /"Unified School"/, Pedagogicheskii slovar' /Pedagogical Dictionary/, Vol. I, 366.

[6] Sergius Hessen and Nicholas A. Hans, Educational Policy in Soviet Russia (London: P. S. King & Son, Ltd., 1930), p. 18.

"Regulations...," all schools were to be designated as "Unified Labor Schools."[7] Hence, a single (or unified) school with a nine-year period of instruction was established in lieu of the multifarious types and structures of pre-Revolutionary education (i.e., District Schools, Higher Elementary Schools, Classical /Greek and Latin/ Gymnasia, Modern /Latin/ Gymnasia, Real Gymnasia or Real Schools, Commercial Schools, Lower and Middle Technical Schools, Crafts and Industry Schools, schools of the Holy Synod, etc.). On the basis of Unified Labor School, a ladder system of education was established. This single system of education was divided into two levels: the First Level and the Second Level, having a period of instruction of five years (for ages 8-13) and four years (for ages 13-17), respectively.

The Unified Labor School was the specific type of consolidated educational institution in which Soviet educational policy would attempt to implement fully the new principles of education. Certain of these educational principles were really carryovers from policies of the short-lived (eight months) Provisional Government--the four most important of which were:

1) The abolition (by the decree of the Provisional Government of 20 June 1917) of the dual pattern of elementary education, which in

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[7] N. N. Nikitin, "Prepodavanie matematiki v sovetskoi shkole 1917-1947 gg." /"Teaching of Mathematics in the Soviet School, 1917-1947"/, Matematika v shkole /Mathematics in the School/, No. 5 (Sept.-Oct., 1947), 4.

Imperial Russia had been divided between the Ministry of Public Instruction and the Holy Synod;[8]

2) A decentralized system of controls for elementary and secondary education (according to decrees of the Provisional Government of 8 May 1917 and 26 September 1917), while retaining overall responsibility for education under a central authority;[9]

3) With regard to higher education, not only were all students, regardless of race, sex, and denomination, who were qualified, allowed to enter the universities, but also, the universities themselves were given complete autonomy, thereby making them fully independent of the Government (decrees of the Provisional Government of 13 June 1917 and June 1917, respectively);[10]

4) Compulsory co-education was to be introduced in all schools (decree of the Provisional Government of 3 May 1917).[11]

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[8] The decree of 20 June 1917 stated:

> ...for an actual and uniform realization of universal instruction all the elementary schools included in the school-system, or all those which receive State grants for their upkeep or for the salaries of the personnel, among others the Church schools under the control of the Holy Synod as well as the Church Seminaries and Higher Grade Elementary Schools are hereby transferred to the Ministry of Public Instruction."
> Hessen, *op. cit*., p. 10.

[9] The decree of 8 May 1917 abolished the Provincial and District Councils of Primary Education and transferred their powers to the local authorities. The posts of Directors and Inspectors of Primary Schools were abolished, while the right of appointing inspectors was conferred on the local authorities, as a result of the decree of 26 Sept. 1917. *Ibid*., pp. 11-12.

[10] The decree of 13 June 1917 did not permit unrestricted enrollment into the universities, however, since *only those who passed the matriculation examination were accepted*. *Ibid*., p. 13.

[11] *Ibid*., p. 20.

Recognizing the impossibility facing the Provisional Government of putting these reforms into practice, due to the October Revolution and the ensuing Civil War (1918-1920), the historian of education must pause to consider whether or not certain basic Soviet changes in educational policy at the time were more evolutionary than revolutionary in nature. The fact that the Provisional Government continued the institution of the parliamentary State Duma, for instance, tends to suggest that its educational reforms were a continuation and manifestation of a growing tradition of liberal democratization generally.[12] The educational reforms of the Provisional Government, which were predicated on liberal and democratic notions espoused by many in Imperial Russian society, represented sincere attempts to correct defects in the Imperial system of education. While the Soviet regime did not share this motivation, nevertheless, it did not oppose building on the educational foundations laid by the Provisional Government.

Any assessment as to whether the educational policy of the Soviet regime is more revolutionary than evolutionary in nature is contingent on two factors: first, the nature of the changes in Soviet educational policy, which exceeded those changes in educational policy attributable to the Provisional Government; second, a determination as to the relative success to which educational policy was actually put into practice in Soviet Russia. Accordingly, an examination of the

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[12] This process of democratization can be traced directly to the unsuccessful revolution in 1905, which, while failing to overthrow the Tsar, did result in the establishment of the Imperial Duma, a representative type of legislative body, in August 1905.

"Regulations for the Unified Labor School of the RSFSR" reveals that the most significant of the new educational goals, which were peculiar to Soviet educational policy, were:[13]

1) A single ladder system of elementary and secondary education, based on the Unified Labor School, was accessible to all types of people (Article 1);

2) Universal and compulsory elementary and secondary education (Article 4);

3) Free education in both levels of the Unified Labor School (Article 3);

4) Secularization of education and neutrality towards religion (Article 6).

Insofar as the viability of these policies in practice is concerned, they, as well as those policies of the Provisional Government, which were reaffirmed by the Soviet Government, were subject to varying degrees of implementation. Hans states that the ladder system [1)] was realized in practice, but that the results were unsatisfactory.[14] Universal compulsory elementary education [2)] would become an accomplished fact only in the mid-1930's, whereas compulsory incomplete secondary education (Grades V-VII) would not become a legal reality until 1949. Free education [3)] was indeed realized, even in the universities, but the existing physical accommodations were substantially inadequate to meet the demands for such schooling.[15] Secularization of education [4)], which is not wholly peculiar to Soviet educational policy,[16] was accomplished, but neutrality towards religion was not practiced.[17] Hence, it must be concluded that while certain of the Soviet policies in education were, in principle, revolutionary, in fact, most of their revolutionary impact was softened and limited by actual conditions and outcomes. Party leaders were thus soon faced with the unavoidable fact that their initial fear of continuing Imperial educational policies could not be assuaged by revolutionary zeal in the form of unrealistic decrees.[18]

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[13] The specific Article numbers of the "Regulations...", indicated in parentheses below, are identified in Hessen, op. cit., pp. 19-20.

[14] Ibid., p. 22.

By contrast, of the four most important educational policies of the Provisional Government to be reaffirmed by the Soviet Government,[19] not only were the abolition of the dual pattern of education and the establishment of compulsory coeducation achieved, but also the decree of 2 August 1918 by the Council of People's Commissars RSFSR,[20] "On Enrollment Into Higher Educational Institutions of the RSFSR," did more than merely confirm legislation of the Provisional Government in this regard. In place of the lone restriction on those entering higher educational institutions, which was intended to ensure their adequate preparation by requiring them to pass a matriculation examination, it substituted another requirement, which was based on the class origin of prospective students. The People's Commissariat of Education[21] was ordered to "take the most extreme measures guaranteeing the opportunity to learn for all who wish....*In the first place there should be accepted persons from amongst the proletariat and the poorest peasantry*, to whom there will be granted stipends in wide measure."[22] (Italics mine.) Hence, the "proletarianization" of higher education initially was deemed more important than the academic qualifications of its students. However, the decentralized system of controls under a central authority, which would have allowed for variation in education policies in accordance with local conditions, existed only in theory. Local administrative units (called Soviets) were controlled by Communist Party cells, which, in turn, carried out the dictates of the central authority--namely, the Central Committee of the Communist Party.[23]

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[15] Free elementary education in Russia dates back to the 18th century. The idea of free secondary education is alone peculiar to Soviet educational policy.

[16] Apart from transferring all educational institutions from the jurisdiction of the Holy Synod, the Provisional Government abolished compulsory religious instruction in the schools by proclaiming freedom of conscience. Hessen, *op. cit.*, p. 13.

[17] *Ibid.*, p. 22.

[18] Cf. p. 117.

[19] *Supra*, pp. 129-130.

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[20] Major legislation in the Soviet Union emanates either from the Government or from the Communist Party.

Formal legislation of the Soviet Government is promulgated both by the *Council of People's Commissars* (abbreviated hereafter as SNK) of the USSR or RSFSR (depending as to whether it is the All-Union SNK or the SNK of the largest and most powerful autonomous republic of the USSR, RSFSR, respectively) and by the *Central Executive Committee USSR* (abbreviated hereafter as TsIK USSR).

Formal legislation of the Communist Party is promulgated by the *Central Committee of the All-Union Communist Party (Bolshevik)* [abbreviated hereafter as TsK VKP(b) ].

[21] The People's Commissariat of Education RSFSR (abbreviated hereafter as Narkompros RSFSR or NKP RSFSR) is the Soviet equivalent of the Imperial Ministry of Public Instruction. Narkompros was founded in accordance with the decree of the II All-Russian Congress of Soviets of 9 Nov. 1917. "Ministerstvo prosveshcheniia" ["Ministry of Education"], *Pedagogicheskii slovar'* [ Pedagogical Dictionary], Vol. I, 693.

[22] P. S. Aleksandrov, *et al.* (eds.), *Istoriia Moskovskogo universiteta* [ History of Moscow University], Vol. II (Moscow: Izd. Moskovskogo universiteta, 1955), p. 25.

Many of the reforms decreed by the Soviet regime in its first few years of power, whether drawn from the previous educational policy of the Provisional Government or freshly stemming from Marxist-Leninist ideology, were well intended improvements over past educational policies. However, one cannot help but to detect a Utopian sense of urgency in some of them, while others defied realistic implementation at the outset, due to the characteristics of Soviet society in its formative years. Here was a society lacking even the barest minimum of financial means to support such far-reaching reforms, and whose early instability could ill allow the decentralized administration of education. But why should the initial endeavors of the Soviet regime in the formulation of educational policy, so incongruous relative to the actual conditions of the time, be unexpected? Wasn't Lenin's scheme for establishing socialism in a relatively backward economy, by reversing the capitalist-socialist cycles of Marx's pattern of economic revolution, a far-fetched dream, which soon too would have to be revised to satisfy the economic realities of society? It would appear that the Communist Party leaders were being realistic in their pursuit of unrealistic educational policies! Civil war and foreign intervention had overextended it economically and militarily. Epidemics, famine, internal violence, and generally deplorable living and material conditions of life had done much to disillusion the public. Education in these first years of Soviet power was to be the showplace of Bolshevik good will--it too was to provide the people with hope for the future. In doing so, its appeal was directed toward the numerically vast majority of Russians--the workers and peasants (over 85% of the population).

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[23] Hessen, op. cit., p. 23.

Democratic and progressive principles not only formed the basis of enrollments at all levels of schooling and of the general aims of education, but also dominated the types of programs and methods of instruction to be pursued in the Unified Labor School. This latter tendency was legitimized, for the most part, by Article 29 of the "Regulations..." of 16 October 1918, which established the full autonomy of the schools (Unified Labor Schools), so that "the State retained only a general control giving full opportunity to private initiative."[24]

The most important of the principles, which were to guide the programs and methods in the "process phase" of educational policy,[25] may be summarized as follows:

> 1) Instruction, "the function of which was to shed the light of knowledge upon all surrounding life," was to be organically associated with productive labor, since "it was established that the basis of life at school must be productive labor as a social necessity."[26]

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[24] Ibid., p. 20.

[25] The reader may refer to the Paradigm on the Conduct of Policy in a Centralized Educational System (p.24 ), which elaborates in a more technical way this "process phase" of educational policy.

[26] I. K. Andronov, "Polveka razvitiia matematicheskogo obrazovaniia v SSSR" / "A Half Century of the Development of Mathematics Education in the USSR" /, Matematika v shkole / Mathematics in the School /, No. 2 (March-April, 1966), 6.

2) Class lessons per day during the first three years of the First Level were not to exceed four hours, in grades IV and V--not to exceed five hours, while all grades of the Second Level (VI-IX) were limited to six hours of class lessons. Homework assignments, punishment, and all examinations (entrance, promotion, and graduation) were prohibited in all grades.[27]

3) The transformation of all schools, regardless of type, was to be facilitated by instructions as to the way in which classes were to be organized under the unified labor concept. This provision seemed particularly appropriate for instruction in the area of mathematics, as the School Reform Bureau of the People's Commissariat of Education had already published a draft model plan for mathematics lessons for the First Level of the Unified Labor Schools in July 1918.[28]

The various measures designed to facilitate the transformation of schools into Unified Labor Schools (such as the working out of model programs of instruction in mathematics) notwithstanding, the consolidation of numerous types of schools into a single system of education could be expected to encounter difficulties. For example, the question arose as to how the grades of the recently established Higher Elementary School[29] were to be correlated with and apportioned among the grade levels of the new unified system of schooling. The result was that the first grade of the Higher Elementary School was consigned to the First Level, or elementary level, of the Unified Labor School, while the upper four grades were distributed among the Second Level, or secondary level, of the Unified Labor School. When one considers that all former Imperial secondary educational institutions, which consisted primarily of the different types of Gymnasia, were also transformed into the Second Level of the Unified Labor School, the heterogeneous grouping of pupils according to academic preparation appears to have been unavoidable! Was it really feasible then to expect that standard programs prepared by a centralized authority, such as the elementary mathematics programs of the School Reform Bureau of the People's Commissariat of Education, could achieve anything but extremely diverse results, particularly when the proletarianization of all levels of education was the most "fashionable" part of the new regime's program?

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[27] Ibid.

[28] Ibid.

[29] Recall that, only shortly before this time (1912-1915), the Higher Elementary School had resulted from the transformation and academic upgrading of the popular Municipal (or Urban) elementary schools. Supra, p. 32.

It was one thing to demand increased proletarianization of higher education by removing all academic barriers for entrance into the VUZ [*vysshee uchebnoe zavedenie*--higher educational institution],[30] which came by the decree of SNK RSFSR of 2 August 1918. It was quite another thing, however, to compensate for the lack of preparation on the part of many, who took advantage of the liberal enrollment policies of the VUZs. The Imperial policy of *partial proletarianization* of State universities,[31] wherein graduates of Real Schools and certain other secondary schools would have been permitted to enter State universities, contrasts favorably with the Soviet policy of full proletarianization, primarily because it realistically did not discount academic preparation as a criterion for advanced instruction. Apparently in recognition of this fact, in 1919 the People's Commissariat of Education RSFSR introduced two new institutions into the organizational structure of the educational system: the State Scientific Council [*Gosudarstvennyi uchenyi sovet*--hereafter abbreviated as the GUS] and the Workers' Faculty [*Rabochii fakul'tet*, or Rabfak].

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[30] The term, VUZ, common in all Soviet literature relating to education, is the general designation for institutions at the higher educational level, including universities, research institutes (where most post-graduate work is conducted), and higher educational institutions preparing specialists in a given branch of knowledge. Owing to their relative abundance and importance, within the VUZ category there are distinguished those institutions having a technical-industrial bias--namely, VTUZs (vysshye tekhnicheskye uchebnye zavedenye--higher technical educational institutions).

Although the dilemma of quantity versus quality in the preparation of scientific cadres did not elicit serious attention until a few years into the second decade of modernization (1928-1936),[32] such ameliorative efforts, as the establishment of the GUS and Rabfaks by Narkompros, suggest that the Soviet regime even in the earliest years of educational policy formulation was not oriented solely toward quantitative considerations. This observation is supported by examining the general framework of the State Scientific Council, particularly the objectives ascribed to it, as an integral component of the Soviet system of education.

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[31] *Supra*, p. 68. This policy was instituted during the term of office of Count P. N. Ignatiev, Minister of Public Instruction (1915-1916).

[32] *Supra*, pp. 122-126.

## The State Scientific Council (GUS)

The State Scientific Council was established on 20 January 1919 by the decree of the State Commission on Education for the general purpose of "carrying out in practice the reform of higher educational institutions and scientific institutions of the RSFSR...."[33] Specifically, its main functions were:

1) The review and processing of educational plans of all higher educational institutions with a view to uplifting the level of teaching, while having in view the preparation of highly qualified workers in the shortest time possible;
2) The working-out of the normal staffs of these educational institutions with an exact determination both of the number of necessary faculties and of the necessary number of professors on each faculty, and of scientific workers, instructors attached to the university, etc.[34]

Obviously the prime motivation behind the establishment of the GUS was the improvement of the quality of training of students, but its jurisdiction was limited to the area of higher education--at least at its inception. However, primary and secondary source materials[35] confirm that the State Scientific Council published programs for the

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[33] Nikolai I. Boldyrev (ed.), Direktivy VKP(b) i postanovleniia sovetskogo pravitel'stva o narodnom obrazovanii; sbornik dokumentov za 1917-1947 gody /"Directives of the All-Union Communist Party and Decrees of the Soviet Government on Public Education; a Collection of Documents for the Years 1917-1947_/, Vol. II (Moscow: Izd-vo Akademii pedagog. nauk RSFSR, 1947), p. 230.

[34] Ibid.

[35] The primary (1) and secondary (2) sources, referred to here, are, respectively:

(1) I. G. Avtukhov and I. D. Martynenko, Programmy GUS'a i massovaia shkola /"The Programs of the GUS and the Mass School_/ (2d ed. rev.; Moscow: Izd. rabotnik prosveshcheniia, 1925);
(2) Hessen, op. cit.

Unified Labor School in mathematics as early as 1923, thereby broadening the scope of its activities to include all educational levels. This fact, in turn, suggests that the reorientation and expansion of the functions of the GUS took place in the very early 1920's, since its programs had to be worked out prior to any consideration of their application. In fact, most official accounts do not even allude to this early expansion of the functions of the GUS, but rather, enumerate its functions on the basis of its expanded orientation. Thus, according to one typical account, within its scientific-pedagogical, scientific-technical, and scientific-artistic sections, to mention only the most prominent ones, the following functions were performed by the GUS:

1) Solutions of the most important problems of the content, organization, and methods of instruction;
2) The approval of educational plans, programs, and textbooks for all elementary, secondary, and higher schools;
3) The publication of the journal *Na putiakh k novoi shkole* [On the Paths to a New School] by the pedagogical section.[36]

*A comparison of the 1919 functions of the GUS with those of the early 1920's indicates a major change in educational policy*. Evident here not only is the attempt to give just a single authority, the State Scientific Council, complete hegemony in methodological matters of education, but also, the attempt to consolidate the methodological activities at all levels of education into one centralized system. The antecedents for such a change in educational policy can be discerned from an examination of those school mathematics programs, which were drawn up prior to the assumption of responsibility for such activity by the GUS, paying particular attention to the organizations from which they originated.

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[36] "Gosudarstvennyi uchenyi sovet (GUS)" ["State Scientific Council (GUS)"] *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I, 279. As will be seen to be significant later in this study, by the decree of the Central Executive Committee USSR (TsIK USSR) and the Council of People's Commissars RSFSR (SNK RSFSR) of 19 Sept. 1932, the functions of the GUS were transferred to the Educational-Methodological Sector of the People's Commissariat of Education RSFSR.

## The development of mathematics programs for the Unified Labor School (1918-1920)

We shall recall that the first program in mathematics, which consisted of a draft of model lesson plans in mathematics for the First Level (elementary grades) of the Unified Labor School, had been prepared by the School Reform Bureau of the People's Commissariat of Education RSFSR in July 1918.[37] This program, bearing the designation of Project of the Model Plan of Studies in Mathematics in the First Level of the Unified Labor School-Commune, and a subsequent program in mathematics for the Second Level, were worked out specifically by the Natural-Mathematics Section of the School Reform Bureau of Narkompros throughout the 1918/1919 academic year.[38] This subsequent mathematics program for the secondary grades of the Unified Labor School, called The Draft of the Compulsory Minimum Knowledge of Mathematics for Soviet Schools at the Second Level,[39] which similarly amounted to a draft of model lesson plans, was the first mathematics program for the secondary school in post-Revolutionary Russia.

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[37] Supra, p. 137.

[38] Nikitin, op. cit., p. 6.

[39] Andronov, op. cit., p. 8.

Such drafts of model plans in mathematics were not worked out by the School Reform Bureau alone. The Petrograd[40] Commissariat of Public Education of the Union of the Commune of the Northern Region almost simultaneously also published a model plan of a mathematics program for both educational levels, which distinctly contrasted with the programs of Narkompros RSFSR.[41]

What is more important, however, as a reflection both of the actual ineffectiveness of the programs, which were prepared by the School Reform Bureau of Narkompros RSFSR, and of the lack of any centralized control, which would assure the dissemination of State-sponsored activities in the creation of program materials, was the successful competition waged by the Moscow Section of Public Education (Moskovskii otdel narodnogo obrazovaniia -- hereafter abbreviated as MONO). In 1920 the Scientific-Methodological Section of MONO published Sample Programs for the Unified Labor School for the First Level.[42] The reason for their appearance, as given by Nikitin, is as follows:

> The new project of programs /̅ of Narkompros RSFSR_/ did not exert an influence upon the work of the young Soviet school, did not reach the mass school, and in those instances when it was received in the schools, it was not accepted by the teachers. Thus, for example,

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[40] The city of Petrograd was originally named St. Petersburg. The German name of St. Petersburg was replaced by the name, Petrograd, at the beginning of the First World War. Petrograd, in turn, was changed to Leningrad in 1924 in honor of V. I. Lenin, who died that same year. Bernard Pares, A History of Russia (New York: Alfred A. Knopf, 1958), pp. 473 and 508.

[41] Andronov, loc. cit.

[42] Nikitin, op. cit., p. 7.

> the Moscow schools worked on their own programs, which had significantly less volume and bore a really educational character.[43]

Another reason for the failure of the programs of the School Reform Bureau to gain real acceptance is that they were drawn up according to individual grades, wherein the different subjects of mathematics (arithmetic, algebra, geometry, trigonometry) were not treated separately, but rather as a conglomerate whole, which was studied only as a tool to be applied to problems of the world. Accordingly, Nikitin asserts that "the great mistake of the first programs was the striving to replace the systematic study of mathematics with episodic excursions into mathematics in connection with the labor work of children."[44] The vehement protest of the Moscow Mathematics Teachers' Club[45] was worded in a resolution, which was adopted following an examination of the first draft of the Project of the Model Plan of Studies in Mathematics in the First Level of the Unified Labor School-Commune:

> ...The erroneous principle underlying the proposal under consideration, to wit, that only problems requiring the application of mathematics exist, and not mathematics as a subject of instruction, will produce consequences that are regrettable in terms of the position of mathematics in the school.
>
> For the reasons presented, the mathematics club holds that the draft of the reform does not satisfy the elementary requirements of pedagogy and science, and foresees serious consequences if it is carried into effect.[46]

The "serious consequences" mentioned here was the threatened elimination of mathematics from the school as an academic subject.

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[43] Ibid.

[44] Ibid.

[45] The Moscow Mathematics Teachers' Club is synonymous with the Moscow Mathematics Circle in Soviet literature on education.

[46] Andronov, op. cit., p. 7.

In reply to these numerous criticisms, O. A. Vol'berg, who was the Chairman of the Mathematics Section of the School Reform Bureau, not only did not attempt to assuage critics of the program, but even endorsed the elimination of mathematics from the school as an educational subject, "and this is not a 'possibility,' but a 'necessity,' which logically results from the prerequisites adopted by the program commission."[47]

Despite their enormous unpopularity and the prevalence of counteracting programs by regional educational organizations (such as the Petrograd Commissariat of Education and MONO), that such controversial programs were prepared under the sanction of the chief Soviet educational authority, the People's Commissariat of Education RSFSR, did, in fact, place the teaching of mathematics, as an academic subject, in an extremely precarious position in the early years of Soviet educational policy.

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[47] O. A. Vol'berg, "Dve mirovozzreniia" ["Two World Outlooks"], *Narodnoe prosveshchenie* [Public Education], Nos. 11-12 (1919). The prerequisites, adopted by the program commission, referred to here by Vol'berg, were stressed in a comprehensive set of explanatory notes, which accompanied the *Project of the Model Plan of Studies in Mathematics in the First Level of the Unified Labor School-Commune*:

> It is not to be concluded from the existence of this plan that the school is to teach the school subject, mathematics, and that it must be given a specific number of hours in accordance with a fixed schedule, during which the pupils are required to master a specific set of mathematics information and skills. *There are only problems requiring the application of mathematics* [italics mine], and the pupils are to solve these problems, i.e., apply the mathematical method to them. But the problems themselves may, in terms of content, be applicable to quite diverse fields of labor and knowledge. Mathematics must spread its roots widely and find food wherever there is a rigorous regularity among phenomena that will yield to quantitative analysis....Andronov, *op. cit.*, pp. 6-7.

In 1920 the School Reform Bureau of Narkompros RSFSR even went so far as to prepare Model Curriculums for the First and Second Level Unified Labor Schools.[48] Their preparation was the first indication that Soviet educational policy, particularly at the elementary and secondary levels, was about to undergo a reorientation in terms of the methodological control over educational programs, which was to be vested in some central authority--namely, the State Scientific Council. Model Curriculums... stipulated the minimum and maximum weekly class hours for the Unified Labor School.[49] Thus, whereas the programs of 1918-19 had left the schools "to their own creative devices"[50] and had published model lesson plans merely to facilitate the educational process, the Model Curriculums... of 1920 reduced this earlier *carte blanche* *vis-à-vis* the cognitive content in the Unified Labor Schools to a choice! The table below depicts one extreme of this choice--the maximum curriculum for the Second Level School:

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[48] Andronov, *op. cit.*, p. 9.

[49] *Ibid.*

[50] *Ibid.*

TABLE 17

MAXIMUM CURRICULUM FOR THE SECOND LEVEL OF THE UNIFIED LABOR SCHOOL (1920)[51]
(HOURS PER WEEK)

| Subjects | Groups (Grades) | | | |
|---|---|---|---|---|
| | VI | VII | VIII | IX |
| 1 Natural Sciences | | | | |
| Physics | 3 | 4 | 4 | 4 |
| Chemistry | - | 3 | 3 | - |
| Biology | 3 | 2 | 2 | 4 |
| Geography | 3 | 2 | 2 | - |
| Astronomy (incl. meteorology) | - | - | - | 2 |
| 2 Mathematics | 5 | 4 | 4 | 5 |
| 3 Language and Literature | 5 | 5 | 5 | 5 |
| 4 Socio-historical disciplines | 4 | 4 | 6 | 6 |
| 5 Art | 3 | 2 | 2 | 2 |
| 6 Physical education | 2 | 2 | 2 | 2 |
| 7 Foreign languages | 2 | 2 | 2 | 2 |
| Total | 30 | 30 | 32 | 32 |

The sequence of hours in mathematics for Grades VI-IX of the Second Level (5, 4, 4, and 5 hours, respectively) seems to have been commonly accepted in subsequent educational programs for the Unified Labor School.[52]

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[51] *Ibid*., p. 10. While Soviet literature on education commonly identifies the four grades of the Second Level of the Unified Labor School as Grades I-IV, in an attempt to preclude their confusion with the elementary grades of the First Level, Grades I-IV of the Second Level will hereafter be specified as Grades VI-IX, respectively, as in Table 17 above.

This tendency, whereby the content of mathematics programs for the Unified Labor School became more precisely identified and delineated, was accorded greater concrete expression in 1920 than the mere quantitative stipulation of the minimum and maximum number of hours to be allotted to the study of mathematics in each grade. It was in 1920/1921 that new *Model Programs in Mathematics* for both levels of the Unified Labor School were again drawn up and published under the auspices of Narkompros RSFSR.[53] These model programs proved to be a marked improvement over the programs of 1918-19 with respect to their completeness, content, and distribution.[54] An attention to detailed methodological considerations, generally in the form of accompanying commentaries for the teachers, was their prime distinguishing feature. As a result, they were much more realistic insofar as the possibility of their implementation in the classroom was concerned. In his analysis of the 1920/1921 programs, Nikitin is so enamored with their content and methodological ideas that he describes them as "reflecting in themselves the progressive ideas of the best teachers and representatives of the mathematics community at the beginning of the twentieth century."[55]

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[52] *Infra*, A. Pinkevich, *Science and Education in the U.S.S.R.* (London: Victor Gollancz Ltd., 1935), p. 29.

[53] "Materialy na professional'nom obrazovanii" /"Materials on Professional Education"_/, *Prosveshchenie (-pedagogicheskii sbornik)* / Education (-Pedagogical Collection)_7, No. 2 (1922), 139.

[54] Nikitin, *op. cit*., p. 9.

[55] *Ibid*., p. 12. N. N. Nikitin (born 1885) is an eminent Soviet methodologist on the teaching of mathematics, whose major specialty, as a textbook writer, deals with the utilization of visual aids in the teaching of mathematics at the elementary and secondary educational levels. His interest in the history of the teaching of mathematics undoubtedly stems from his membership in the Institute of Methods of Instruction, attached to the Academy of Pedagogical Sciences.

Of course, the general pedagogical sentiment, so prevalent in the programs of 1918-19, was still much in evidence in the programs of 1920/1921. For example, the educational importance of mathematics per se continued to be underestimated, while the emphasis on the connection of theory with practice was still extreme.[56] The continuation of such trends notwithstanding, however, the fact alone that the preparation of new mathematics programs for the Unified Labor School took place in 1920/1921 demonstrates the receptiveness of Soviet educational policy-makers to rapid change and sudden innovations--at least until the stabilization of Soviet education in the mid-1930's. Whereas this flexibility of Soviet educational policy up through early 1921 was primarily a response to criticism, which was more disposed to traditionally tried-and-tested practices in mathematics teaching, with the inception of the New Economic Policy (NEP: 1921-1927), the economic programs of Soviet society tended to be the principal source for suggesting change in educational policy.

While Soviet educational policy overtly pursued technical/economic goals from 1921 onward, nevertheless, this cultural bias of Soviet society was implicit in the curriculum for the Second Level of the Unified Labor School in 1920. For instance, the natural-scientific subjects and mathematics comprised sixty-two hours--exactly 50% of the "maximum curriculum"--of the latter.[57] Yet, this interest of the State in interjecting the ingredients of an industrial culture cannot be attributed originally to pre-NEP Soviet Russian educational policy. A similar grouping of the natural-scientific subjects (physics and cosmography, chemistry, geography, and natural science generally) and mathematics of the Second Level (Classes IV-VII) of the Real secondary institutions, amounting to 49.5% of the curriculum (forty-nine hours out of a total of ninety-nine hours),[58] suggests that Imperial educational reformers in 1916 already were well aware of this scientific/technical cultural deficiency. Since the 1916 educational reforms incorporated in the Ignatiev Plan, as already suggested, never stood a chance of realization, one might classify the Soviet propensity for scientific and technical education in 1920 as the point at which this tendency in late-Imperial and early-Soviet education was first realistically institutionalized.

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[56] The following assertion of the authors of the 1920/1921 mathematics programs typifies the orientation given to the programs with respect to these two aspects:

> It is necessary to strive so that not a single bit of information is given to the students without concrete instructions on its practical application in science and techniques, and more than that, without practical application of it on the spot in the school to industry. It is necessary to strive, as far as possible, so that every new mathematical suggestion resulted from the requirement of students of the solution of one or another practical problem.... Ibid., p. 9.

It is with the introduction in August of 1921 of the Programs of the Seven-Year Unified Labor School that the active entry of the State Scientific Council (GUS) into elementary and secondary education took place, even if in an indirect manner. That is, the Educational Research Section of the State Scientific Council approved the 1921 Programs for the Seven-Year Unified Labor School, but they were developed by the educational research institutes of the Main Administration for the Social Upbringing and Polytechnical Education of Children (Glavsotsvos).[59] The introduction of these new programs in 1921 marks the culmination of the trend, which began in connection with the introduction of the Model Curriculums for the First and Second Level Unified Labor Schools in 1920, wherein methodological control over school programs became genuinely unilateral. That is, earlier drafts of model lesson plans and model curriculums were optional and not "cut and dried" in nature. They had been constructed on the premise that "every school as an autonomous individual institution, would elaborate its own program in accordance with general principles, but adjusted to local conditions."[60] But unlike the programs preceding them, the 1921 Programs of the Seven-Year Unified Labor School were not "model" programs. Cherkasov refers to them as the "first post-Revolutionary mathematics syllabi."[61] The term "syllabi" here appears to be misleading, however.

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[57] Cf. p. 147 (Table 17--Maximum Curriculum for the Second Level of the Unified Labor School /̲1920̲/ ).

[58] Cf. p. 42 (Table 5--Secondary School Curricula Under the Ignatiev Plan /̲1916̲/ ).

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[59] Andronov, loc. cit. These 1921 programs are to be distinguished from the 1920/1921 programs just discussed. Infra, p. 273, for the identification of Glavsotsvos and its function in the Soviet system of education.

[60] Hessen and Hans, op. cit., p. 100.

[61] R. S. Cherkasov, "The Development of the Teaching of Mathematics in Soviet Schools," translated by Bruce R. Vogeli, Manuscript from the personal files of Bruce R. Vogeli (Mathematics Department, Teachers College/Columbia University), p. 1. (Mimeographed.) R. S. Cherkasov is the present editor of Matematika v shkole /Mathematics in the School/ and the Dean of the Mathematics Faculty of the Lenin Pedagogical Institute in Moscow.

This term is generally used to connote a compilation of specific academic material, which is arranged in a definite system and is compulsory for pupils at particular grade levels. According to Nikitin, while the 1921 programs "did not contain the word 'Model,' in the explanatory note the freedom of 'pedagogical maneuvering' was emphasized."[62] Nikitin views the arrangement of the material into a definite system by individual subjects as their principal distinction from the other programs of Narkompros RSFSR.[63] With the exception of the programs drawn up in 1918 by the Petrograd Commissariat of Public Education,[64] these were the first Soviet programs in which mathematics instruction was broken down according to its constituent subject areas (i.e., arithmetic, geometry, algebra, trigonometry, etc.), as had been the common practice in Imperial mathematics programs. Up to this time the authors of all mathematics programs, even the 1920/1921 programs, which were reminiscent of the progressive ideas in mathematics teaching at the beginning of the twentieth century,[65] had always stressed the connection between the different mathematical disciplines to the detriment of their rigorous treatment as distinct branches, worthy of study in and of themselves. Despite their uniqueness in treating the various subject areas of mathematics separately, however, they still upheld the idea of stressing the utilitarian and applied significance of mathematics instruction, as the authors of these 1921 programs indicated:

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[62] Nikitin, op. cit., p. 15.

[63] Ibid.

[64] Supra, p. 143.

[65] In stressing the establishment of the connection between individual mathematical subjects, the authors of the 1920/1921 programs stated:

> In the general-education school there is not able to be carried out sharp boundaries between individual mathematical disciplines, and they should not be studied in succession, as this took place in the old school....Therefore, the study of arithmetic and geometry should be begun and conducted simultaneously; and elements of algebra are able to be added to them in an organic connection highly early....
> Nikitin, op. cit., p. 10.

> It is possible not to study mathematics as a special subject, but the alphabet of exact knowledge should be known to any educated person, and furthermore, not as something detached and alienated from other areas of knowledge and life, but, on the contrary, should be interspersed in them as an element, which economizes forces and time in the solution of very ordinary, everyday problems, with which practical work comes together at every step, whatever direction it takes....
>
> It is necessary to strive so that in the consciousness of the pupil dry formulas and signs will come to life, acquire real meaning, and then, even with that little knowledge which he will get out of school, he himself will find an application; for this it is necessary to strive by all ways, by all means.[66]

Perhaps the 1921 Programs of the Seven-Year Unified Labor School might better by designated "pseudo-syllabi." That is, they possessed the necessary attributes of syllabi (i.e., a definite arrangement and organization of material, internal structure and consistency, completeness, concrete methodological instructions), but they lacked the force of syllabi.[67] In terms of their potential, they fulfilled the prerequisites of syllabi. Yet, in practice, their implementation according to a fixed scheme was not called for. In a sense, they were to Soviet education what the programs for the Gymnasia, which were drawn up on the basis of the Statute of 1871, were to Imperial education[68]--the first educational programs of a centralized system of education intended to be compulsory. Unlike the latter, however, which were rather uniformly adhered to, their implementation proceeded in an irregular pattern--hence, the term "syllabi" cannot judiciously be ascribed to them.

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[66] Ibid., p. 15.

[67] With respect to mathematics, the greatest deterrent to their achieving the status of genuine State syllabi, which uniformly and systematically guided the study of the individual branches of mathematics, appears to have been both the inability of their authors to arrive at some consensus as to the adoption of particular mathematics problem books toward which instruction could be geared and the minimization of the importance of such problem books. For example, having agreed as to the content and nature of problems of arithmetic, the authors of the 1921 programs stated:

> It is impossible to recommend one of the published problem books for the students. Each problem book, on account of its universality, is unfit for every school. It is necessary to write a problem book for each school separately, that is, the student himself must do this.

Similar to the programs of 1918-19, the mathematics sections of the programs of 1921, as defined by course "syllabi," were "overloaded." There was too much academic material to be covered in the time allotted. The result of such overloading would be a superficial coverage of the material, wherein the indiscriminant use of rules would prevail over attempts to give the students a true understanding of what was studied.[69]

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> The absence of a suitable problem book scares many students. But this is a misunderstanding based on routine and habit. Surrounding life gives us so many diverse phenomena...that inventing problems is nothing.... Ibid., p. 14.

[68] Supra, p. 45.

[69] The inclination to underestimate the theoretical foundations of mathematics in mathematics instruction, which is evident from the following admonition of the authors of the 1921 mathematics programs regarding unnecessary enthusiasm for problems of deriving the rules of multiplication of simple fractions, verifies such speculation as to the unavoidable superficiality of their coverage:

> ...this explanation in essence is very difficult, and while the students are able to learn it, they scarcely master it; therefore, it is more advisable to teach the rule of multiplication of fractions dogmatically--in other words, to make the rule by definition of the operation. Nikitin, op. cit., p. 13.

This tendency contrasts with the pedagogical tenets guiding the preceding 1920/1921 programs, which recognized the fact that the volume of a course stands in some kind of correspondence with the time allocated to its teaching.[70] Thus, the 1920/1921 programs, while not minimizing the importance of applications of mathematics, struck a certain balance between instruction in the theory and practice of mathematics, even though they too emphasized to extreme the connection of theory with practice in achieving this balance. Accordingly, in the explanatory notes to them, the authors stressed:

> ...the most important task, for which the teaching of mathematics in the general-educational school should strive, is the awakening in the students of mathematical thought....The students as a whole should be placed in such a position that they will not learn mathematical tricks in a prepared form, but as though they themselves once again rediscovered them in the process of independent work.[71]

Such a statement might well have come from prefatory remarks addressed to the teacher in some of the "new mathematics" programs currently in use in the United States.

It would appear that with the introduction of the vastly improved mathematics programs of 1920/1921, the Unified Labor School could have achieved some stability in the teaching of mathematics. Why, then, were they replaced by the 1921 programs, which were developed by the Glavsotsvos and approved by the State Scientific Council? The answer to this question lies in the amorphous nature of Soviet educational policy prior to its "crystallization" in the mid-1930's. Such flexibility and lack of stability can be understood in the light of a sequence of historical observations.

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[70] For instance, in the teaching of algebra, such important topics as combinations and Newton's binomial theorem, the theory of probability, and complex numbers were not included, since "we /authors of the programs/ consider such an organization of the matter, under which each section of algebra will be studied possibly deeper, far more valuable than superficial acquaintance with a course large in volume." Ibid., pp. 10-11.

[71] Ibid., p. 10.

Soviet educational policy was primarily a response to the doctrine of economic determinism espoused by Marxism-Leninism, which made certain demands of the educational system as a means of preparing a scientific-technical labor force. The result was a conditioning of Soviet educational policy so that it became highly sensitive to teleological considerations. In addition, since a rapidly industrializing society must stress short-range objectives in its economic planning, then the aspect of flexibility was required to meet and to deal with all contingencies arising under such an accelerated growth. Thus, educational policy's close connection with changing emphases in economic development not only conditioned its teleological aspect, but also accounted for its flexibility -- these characteristics resulting in the relative instability of the Soviet educational framework up to the mid-1930's.

So it was, then, that the mathematics programs of 1920/1921, despite their rather high quality, were short-lived. The 1921 programs, which replaced them, were drawn up in order better to reconcile education with the economic and social needs and conditions at the time.

The period of war communism (1917-1920) had ended--the Communist Party having done much to secure its originally precarious position. With the launching of the New Economic Policy (1921-1927), the period of so-called "socialist construction" began in earnest. It is necessary to bear in mind Lenin's "unwillingness to wait patiently for history to carry a feudal, underdeveloped economy...through a prolonged period of bourgeois capitalism and parliamentary government."[72] The acceleration of the process of transformation to a socialist state, so contrary to orthodox Marxism, could now be feasibly pursued. Yet, due to both the state of economic underdevelopment before the October Revolution and the losses incurred through military activity, there was an alarming shortage of scientific-technical manpower. In education, in the school, the Communist Party saw the most effective and expedient means to fill this manpower gap and, thereby, to effect this acceleration toward an industrialized, socialistic society. Education, therefore, "must be subordinated to the partisan communist ends."[73] The platform of the Communist Party now became the basis for educational policy, and in it was defined the aim of education:

> During the period of the dictatorship of the proletariat, i.e. during a period when the conditions for a complete realization of Communism are prepared, the school ought to be a tutor in the principles of Communism; more than that, it ought to be a centre of an ideological, organized educational influence of the proletariat on the non-proletarian masses in order to educate a generation, capable of establishing Communism in its integrity. (Italics mine.)[74]

The only way to ensure the fulfillment of this aim, particularly when the vast majority of teachers were non-communists, was to limit the initiative of the teachers through detailed instructions with regard to the "what" and the "how" of the curricula, i.e., through the introduction of compulsory syllabi or, at least, as in this instance,

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[72] Supra, p. 113.

[73] Hessen and Hans, op. cit., p. 102.

[74] Ibid.

"pseudo-syllabi."[75] Thus, the replacement of the mathematics programs of 1920/1921 by the first post-Revolutionary "syllabi" came about from more than the consideration of merely educational criteria.

This change in educational policy in 1921, obviously intended to serve as a catalyst in expanding the available pool of educated manpower, resulted in the transformation of the Unified Labor School to include a seven-year school, in addition to the original nine-year school.[76] The mathematics programs had to be redesigned accordingly, which explains, in part, the criticism directed at the 1921 Programs of the Seven-Year Unified Labor School for being overloaded.[77]

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[75] For a penetrating discussion of the ideological controversy over what education should be and how it related to the revolution, see the article of Frederic Lilge, "Lenin and the Politics of Education," Slavic Review, Vol. XXVII, No. 2 (June, 1968), 230-257 (especially pp. 233-236, 239).

This dissertation carries Lilge's discussion into the very heart of the matter, that is, into the specific curricular and methodological policies and outcomes of educational ideals, which Lilge discusses from a rather abstract plane of thought.

[76] Interestingly enough, even in a highly centralized system of education, actual changes in the framework of education sometimes precede their official authorization. The introduction of the Seven-Year School did not become official until the Education Act of 1923, and even then, Grades VIII and IX were retained, although on a non-compulsory basis. Nonetheless, the Seven-Year School unofficially came into existence in 1921 as a result of two related actions: first, a republic-wide Party conference, after noting the obstacles in shifting to a period of peacetime construction, considered it essential "temporarily /italics mine_/to regard compulsory education to mean seven years of schooling." (Andronov, op. cit., p. 9.); second, a congress of representatives of gubernia (local administrative unit) departments of public education, convened by Narkompros RSFSR, approved a reform of the Unified Labor School such that the First Level became a four-year school and the Second Level was divided into two cycles: an initial, compulsory cycle of three years and a non-compulsory two-year second cycle. Ibid., pp. 9-10.

[77] Supra, p. 154.

Greater than its effect on the labor supply and on the drawing up of new mathematics programs, however, was the role that the introduction of the Seven-Year Unified Labor School assumed within the total context of Soviet education. While the Seven-Year School was not officially sanctioned until 1923, the introduction of the *Programs of the Seven-Year Unified Labor School* in August of 1921 attests to its existence at that time. It is no mere coincidence that at this same time the Soviet regime put into practice its new scheme of vocational education. This scheme included a specific type of institution, the Technicum, the network of institutions of which comprised a vocational/technical superstructure built on the structure of the general Seven-Year School. Within four years the Soviet government had reversed its original intent to build a unified system of schooling!

## Problems in vocational education

From the earlier discussion of Imperial education, we observed that the Soviet regime had inherited a vocational/technical structure of education. However, by focusing its efforts in the realm of elementary and secondary schooling exclusively on the Unified Labor School, the Soviet government appeared to disregard such a heritage in formulating initial educational policy. Perhaps it was not "disregard" at all, but rather, a "rejection" of this heritage, since a closer examination of the ideal of *polytechnical education* discloses it to be in contradiction to the concept of *specialization*, which is somewhat synonymous with the

Imperial version of vocational/technical education. Albert Pinkevich,[78] one of the most influential and articulate spokesmen among the educational thinkers in Soviet Russia during the first two decades of its existence, aptly describes polytechnical education as follows:

> It would be wrong to think that polytechnical education means merely that the children perform different kinds of manual work at school. *Polytechnical education aims, before everything else, at linking up manual work with general instruction, and at giving a broad idea of the chief branches of industry* with which manual work can be coordinated. *The whole spirit of the Soviet polytechnical schools is diametrically opposed to the mere teaching of trades*. Physical labor combined with intellectual effort for the attainment of that polytechnical outlook to which Lenin referred--such is the essence of polytechnical instruction. This instruction embraces the mechanical industry, the chemical industry, the power industry, and agronomy. In making a special study of each of these subjects the students acquire a knowledge of the basic features of industry as a whole. (Italics mine.)[79]

Notwithstanding the differences which set polytechnical education apart from the concept of specialization in vocational/technical education, however, there is a common tendency shared by each: emphasis on the connection between theory and practice--*the most important principle of*

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[78] Albert P. Pinkevich (1883-1939) was graduated from the physico-mathematics department of Kazan University in 1909 as a geologist. While considered as politically unreliable by the Imperial government, he fared much better under the Soviet regime. In 1917 he received an appointment as professor at the Higher Pedagogical Institute in Leningrad, and in 1918 he became director of the newly organized Hertzen (Gertsen) Pedagogical Institute. In 1924 Pinkevich received an appointment to the Second Moscow State University, and simultaneously worked as Director of the Research Institute of Scientific Pedagogy. In 1932 he was appointed to the newly organized and influential All-Union Committee on Higher Technical Education, where he served as chairman of the Committee on Educational Methods. His *Pedagogika. Opyt marksistskoi pedagogiki* /_Pedagogy. The Experiment of Marxist Pedagogy_/, published in two volumes in 1924-25, and *Nauka i obrazovanie v SSSR* /_Science and Education in the U.S.S.R._/ are the best known of his numerous works. "Pinkevich" /_"Pinkevich_/, *Pedagogicheskii slovar'* /_Pedagogical Dictionary_/, Vol. II, 127. Also: Albert P. Pinkevich, *Science and Education in the U.S.S.R.* (London: Victor Gollancz Ltd., 1935), p. 4.

[79] Albert P. Pinkevich, *Science and Education in the U.S.S.R.* (London: Victor Gollancz Ltd., 1935) pp. 30-31.

*Soviet pedagogy*.[80] It is precisely this mutual regard by their advocates for the application of theory to practice that tends to moderate the inclination to consider the Soviet system of polytechnical education as strictly evolutionary. The Imperial vocational/technical structure of education, while stressing preparation in a particular specialty, as opposed to a polytechnical type of training, was similarly predicated on the principle of combining theory with practice. Theoretical instruction was primarily imparted at the lower levels in Imperial schools of the *general educational structure*, whereas specialized training or practical instruction generally took place later in the schools of the *vocational/technical superstructure*.[81] Hence, the ideal of combining theory with practice in the educational process was not peculiar to the Soviet regime. What was unique to Soviet educational policy, during early attempts to establish polytechnical education as the basis for a unified school system, was its method of reconciling theory with practice by attempting to *interweave them simultaneously* into the educational process within ordinary schools of the general education structure.

Whereas vocational/technical types of educational institutions, which had declined seriously, began to show new life in 1921, at about the same time as the inception of the Seven-Year Unified Labor School, vocational education became officially endorsed by decree in January

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[80] "Matematika v shkole" [ "Mathematics in the School" ], *Pedagogicheskii slovar'* [ Pedagogical Dictionary ], Vol. I, 669.

[81] *Supra* , p. 78.

1920. This decree reestablished the Department of Vocational Education,[82] which was redesignated the Chief Committee of Vocational Education of Narkompros RSFSR, only to be changed in 1921 to the Chief Administration of Vocational Education of Narkompros RSFSR (*Glavnoe upravlenie professional'nogo obrazovaniia* Narkomprosa RSFSR--hereafter abbreviated as Glavprofobr).[83] While it was officially established as a department of the People's Commissariat of Education RSFSR, in actuality it functioned almost independently of Narkompros.[84] Under its authority were placed not only all vocational schools at the lower levels of education, but also all higher educational institutions (VUZs), including including universities, *as any type of higher education was hereafter construed to be vocational*.[85] The Soviet provision of placing *all* higher education under the jurisdiction of vocational-professional administration represented an *historical first*. The theoretical implications were as revolutionary as was the historical event itself and reflected the strongly pragmatic and utilitarian values that motivated the Lenin Government. As a major stroke of educational policy, the Government aimed at converting the universities from isolated retreats for men of wisdom into "knowledge factories" to feed specialists into a technically starved economy.

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[82] The Department of Vocational Education of the Imperial Ministry of Public Instruction had been abolished by the Soviet Government shortly after its assumption of power. Its abolition, together with the high expectations held for the single system of Unified Labor Schools, the versatility of which served as the rationale for their replacement of both technical and general schools, resulted in the rapid dismantling of the vocational schools of Imperial origin. If on the present territory of the U.S.S.R. there existed a total of 2,877 lower and secondary vocational/technical schools in 1914/1915 (*supra*,p.77 /_Table 10 on Comparison of General and Vocational/Technical Structures of Imperial Education, 1914/1915_/), then of the approximately 1500 of them, enrolling 170,000 pupils, which were in the single republic of the R.S.F.S.R., by 1918-19 only 475 schools with 33,259 pupils were left. Hessen and Hans, *op. cit*., pp. 141-42.

[83] "Glavprofobr" /_"Chief Administration of Vocational Education"_/, *Pedagogicheskii slovar'* /_Pedagogical Dictionary_/, Vol. I, 266.

[84] Hessen and Hans, *op. cit*., p. 142.

[85] "Glavprofobr," *loc. cit*.

The revival of a vocational/technical structure of education was due largely to the trade unions in the R.S.F.S.R., since they were "first to recognize the futility of the attempt to impart a 'polytechnic' education in ordinary primary and secondary schools."[86] The trade unions, of course, were concerned with filling their war-ravaged ranks with skilled workmen. Polytechnical education to them did not appear to be a realistic replacement for vocational education, which, in preparing students for a particular specialty, had the advantage of filling vacancies with trained persons coming directly from school.[87]

The People's Commissariat of Education too was quick to recognize the rather discouraging results of polytechnical education. In its Report for 1917-1920 it summed up the situation most realistically:

> The attempts at a straight-forward realization of this programme without a sufficiently thoughtful taking into account of the *actual conditions* were met with so many insurmountable obstacles that they have given very meagre and sometimes even negative results. They inevitably tended either to narrow training in some craft or to very coarse forms of manual work which were quite unnecessary from a pedagogical point of view and were exhausting for the weak organisms of children. (Italics mine.)[88]

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[86] Hessen and Hans, *loc. cit*.

[87] A major "assault" was launched against polytechnism by the leading vocational educator from the Ukraine, Grinko. For an account of his views, see L. Volpicelli, *L'evolution de la pédagogie soviétique* (Neuchâtel: La Baconnière, 1954).

[88] Hessen and Hans, *op. cit*., p. 101.

The "actual conditions" cited above undoubtedly referred to: the poor material conditions, both of the equipment of the schools, most of which lacked workshops and school farms, and of the students, most of whom lacked writing supplies; the lack of sufficient facilities in the community for industrial practice; the majority of the teachers' unfamiliarity with and poor preparation for polytechnical instruction.

With the need for specialized vocational education having gained at least official, if not popular, acceptance by 1920-21,[89] the Soviet system of education within three to four years had come to approximate the dual structure of Imperial education! Now composed of both a general educational and a vocational/technical structure, it reconciled these two structures organizationally according to the same precepts established by Imperial educational policy. That is, the general educational structure was to be the common launching point for both branches of schooling, whether general academic or vocational/technical. Varying with the given type of vocational institution--the more sophisticated types requiring a greater general academic foundation, the vocational/technical structure was then to form an "offshoot" of the general educational structure. As in the Imperial system of education,[90] this "offshoot" was a particular type of superstructure, comprised of vocational/technical institutions having parallel general educational equivalents in the general educational structure. Thus, according to the provisions for vocational education, issued on 20 July 1920, there were three main types of vocational/technical schools, each built on different grade levels of preparation in the general educational structure and training specialists of different qualifications. They were as follows:

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[89] For a comprehensive historical account of the development of vocational/technical education at the lower and secondary levels of education in Imperial and Soviet Russia, see A. N. Veselov, Professional'no-tekhnicheskoe obrazovanie v SSSR (Moscow: Proftekhizdat, 1961). In this source (p. 7) Veselov breaks down the development of vocational/technical education during 1917-1940 into three principal chronological stages as follows:

1) 1917-1920 period: The breaking of the old pre-Revolutionary system of technical education and of the bureaucratic apparatus of its administration and the first steps in the creation of the Soviet system of vocational/technical educational institutions under conditions of foreign military intervention and civil war, as well as under conditions of economic devastation.
2) 1921-1929 period: The appearance and strengthening of the new Soviet system of vocational/technical education, the mass opening of lower and secondary educational institutions of a new type (Schools of Factory-Workshop Apprenticeship--FZU /Cf. p.279 for identification of FZU _/ and Technicums).
3) 1930-1940 period: Following the decree of the November 1929 Plenum of the Party Central Committee, according to which all vocational/technical educational institutions were transferred to the authority of national economic commissariats, the huge spread of vocational/technical education.

Chapter III of this source is devoted entirely to the critical 1921-1929 period.

For a discussion of the dispute in 1920-1922 over the cognitive content of a general education based on the polytechnical principle versus that of "vocationalism," including the popular disillusionment precipitated by the reestablishment of a vocational/technical structure of of education, see the article of Lilge, op. cit., pp. 237-240.

1) vocational and technical schools, which were based upon the four-year elementary school and prepared masters or foremen;
2) technicums, which were built upon the Seven-Year Unified Labor School and prepared engineers with narrow qualifications;
3) higher technical institutions (VTUZs) and higher scientific institutes (under the jurisdiction of universities), both

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[90] Supra, pp. 80-81.

based on the Nine-Year Unified Labor School, and which prepared directing engineers and research engineers, respectively.[91]

In essence, there had occurred a partial, yet temporary and gradual, discrediting of the polytechnical ideal in education and a concomitant rise in specialized vocational education, which resulted in the reestablishment of dual structures of education. That is, by these measures, Soviet authorities countered the ideologically based trend toward establishing a polytechnical educational system for all youth, and they thereby resumed the traditional organization of Russian education characterized by dual structures. Similar to the programs of the vocational/technical structure, the 1921 Programs of the Seven-Year Unified Labor School of the general educational structure too held paramount the utilitarian and applied aspects of mathematics instruction,[92] despite their uniqueness in treating the different subject areas of mathematics separately. They aimed not only at teaching the discrete categories of mathematics, but also kept in view the educational aim of using and applying knowledge in concrete contexts. Hence, an emphasis on the combination of theory with practice was particularly noticeable in the more academically oriented general educational structure and stood in contrast to the "applied" imbalance of the vocational/technical structure.

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[91] Hessen and Hans, op. cit., p. 143. Post-graduate study was also conducted in the higher scientific institutes.

[92] Supra, p. 153 (quotation designated by footnote #66 ).

The various mathematics programs at the elementary and secondary levels up through the mid-1930's do indicate an appreciable range with regard to the relative attention accorded theoretical and applied instruction or activity. In other words, there was a dialectical movement of Soviet educational policy between the pedagogical attitudes of "classicism" and "realism,"[93] with their corresponding emphases on general or theoretical preparation, based on verbal-literary criteria, and utilitarian or practical preparation, based on scientific knowledge and practical skills, respectively. This fact notwithstanding, the attempt to make learning of practical value permeates, to greater or lesser degrees, all extremes of Soviet educational policy.[94] This attempt represents the embodiment of the most important principle of Soviet pedagogy, to which even the teaching of mathematics is subordinated--the principle of the unity of theory with practice.[95]

As already implied, polytechnical education only gradually began to lose some of its appeal with the cautious re-entry of vocational institutions onto the education scene in 1921. In an endeavor more readily to identify changes in mathematics instruction, stemming from the decreasing appeal of polytechnical education, authorities set the aims of polytechnical education with respect to the teaching of mathematics as follows:[96]

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[93] Supra , p. 51.

[94] The attempt to make learning of practical value is so consistently prevalent throughout Soviet educational policy that Medlin characterizes it as the " 'golden thread' throughout the total Soviet effort at educational reconstruction since 1917, linking all periods together in a common design...." William K. Medlin, Soviet Education and Social Reconstruction, A Report to the Council on Foreign Relations, Washington, D.C., June, 1966 (Ann Arbor: University of Michigan, 1966), p. I. (Mimeographed.)

[95] Supra,pp.160-1(footnote #80 ).

1) Instruction in mathematics should approximate the needs of production.

2) The relationship of mathematical laws to those of nature and production should be emphasized.

3) Skills necessary to invest problems from life with mathematical "garb" must be developed.

4) Skills necessary in socially useful work should be encouraged.

The Programs of the Seven-Year Unified Labor School not only contained provisions for achieving these polytechnical goals, but also, probably because these 1921 programs represented the first post-Revolutionary programs having the mass-compulsory potential of true syllabi, two other objectives appear to emerge as guidelines, which were to find reflection in mathematics instruction: general educational objectives and ideological-political objectives.[97] It is not implied here that general educational and ideological-political objectives were absent in the formulation of the model mathematics programs prepared prior to 1921, but simply that these two objectives in conjunction with the polytechnical objective were consciously pursued as an integral whole from this time. Subsuming all of these objectives and uniting them into a common design with a singleness of purpose is the Soviet philosophy of science generally, and the Soviet philosophy of mathematics in particular.

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[96] Politekhnicheskoe obuchenie v prepodavanii matematiki /Political Instruction in the Teaching of Mathematics_7 (Moscow: Uchpedgiz, 1956), pp. 3-4, cited by Bruce R. Vogeli, "Soviet School Mathematics--Past, Present, and Future" (Mathematics Department, Bowling Green University, 1964), p. 7. (Mimeographed.)

[97] This classification of objectives for the teaching of mathematics is used by S. E. Liapin in Metodika prepodavaniia matematiki /Methods of Teaching Mathematics_7 (Leningrad: Uchpedgiz, 1956), p. 7.

## Mathematics as a reflection of the Marxist philosophy of science

Engel's analysis of mathematics as a genuinely materialistic science provides the philosophical framework of mathematics instruction at all educational levels in the Soviet school:

> That pure mathematics has a validity which is independent of the particular experience of each individual is, for that matter, correct,....But it is not at all true that in pure mathematics the mind deals only with its own creations and imaginations. The concepts of number and form have not been derived from any source other than the world of reality. The ten fingers on which men learnt to count, that is, to carry out the first arithmetical operation, may be anything else, but they are certainly not a free creation of the mind. Counting requires not only objects that can be counted, but also the ability to exclude all properties of the objects considered other than their number - and this ability is the product of a long historical evolution based on experience. Like the idea of number, so the idea of form is derived exclusively from the external world, and does not arise in the mind as a product of pure thought. There must be things which have shape and whose shapes are compared before anyone can arrive at the idea of form. Pure mathematics deals with the space forms and quantity relations of the real world--that is, with material which is very real indeed. The fact that this material appears in an extremely abstract form can only superficially conceal its origin in the external world. But in order to make it possible to investigate these forms and relations in their pure state, it is necessary to abstract them entirely from their content, to put the content aside as irrelevant; hence, we get the point without dimensions, lines without breadth and thickness, "a" and "b" and "x" and "y", constants and variables; and only at the very end of all these do we reach for the first time the free creations and imaginations of the mind, that is to say, imaginary magnitudes. Even the apparent derivation of mathematical magnitudes from each other does not prove their *a priori* origin, but only their rational interconnection. Before it was possible to arrive at the idea of deducing the form of a cylinder from the rotation of a rectangle about one of its sides, a number of real rectangles and cylinders, in however imperfect a form, must have been examined. Like all other sciences, mathematics arose out of the *needs* of men; ... *pure* mathematics is subsequently *applied* to the world, although it is borrowed from this

> same world and only represents one section of its forms of interconnection--and it is only just precisely because of this that it can be applied at all.[98]

Both as its basis and its ultimate object, therefore, mathematics has the objective reality of the real world. Any aspect of mathematical knowledge develops according to a sequence of four stages:

1) recognition of certain *needs* of men;

2) *reconciliation* of the given needs with the space forms and/or quantity relations of the real world;

3) *abstraction* of these space forms and/or quantity relations from their content;

4) *application* of the laws abstracted from the real world (i.e., pure mathematics) to the same world from which they were originally borrowed and to which they are rationally interconnected.

This sequence of the development of mathematical knowledge, which is predicated on the writings of Engels, should not be construed to suggest that Engels was preoccupied with just the materialistic basis of scientific knowledge, however. His materialistic concern with the conditioning effect on all scientific knowledge of man's environment--past, present, and future--prompted him to incorporate the dialectical development of knowledge as a fundamental concept, along with materialism, underlying his theory of knowledge.[99] Specifically, the content of mathematics is a product of past and present contributions within the existing environment, but advanced criteria for the future, which account for its progressive sophistication through change and the demand for greater rigor, make its present value only conditional. Thus, Engels described the relationship between man's knowledge and truth as asymptotic[100]--the former continually approaching closer to the latter, which is considered to be at infinity.

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[98] Frederick Engels, *Anti-Dühring* [Herr Eugen Dühring's Revolution in Science] (London: Martin Lawrence Ltd., 1939), pp. 47-48. Herr Dühring's philosophy of mathematics was based on two major premises:

1) [One] can produce ready-made the whole of pure mathematics *a priori*, that is, without making use of the experiences offered us by the external world. In pure mathematics, in his view, the mind deals 'with its own free creations and imaginations';
2) The concepts of number and form...even have 'a validity which is independent of *particular* experience and of the real content of the world.' *Ibid*., p. 46.

It is evident, according to the passage cited in the main text above, that Engels is in disagreement only with the first of these premises.

Engels' and Marx's theory of knowledge, known as dialectical materialism, is a fundamental tenet of Marxist philosophy. The collaboration between Marx and Engels in their writings was so close, in fact, that their views on the philosophy of science are described as "virtually inseparable" by Joravsky,[101] and "in agreement" by

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[99] Engels describes his dialectic philosophy as follows:

> The great basic idea that the world is not to be viewed as a complex of fully fashioned objects, but as a complex of processes, in which apparently stable objects, no less than the images of them inside our heads (our concepts), are undergoing incessant changes, arising here and disappearing there, and which with all apparent accident and in spite of all momentary retrogression, ultimately constitutes a progressive development....
>
> In the eyes of dialectic philosophy, nothing is established for all time, nothing is absolute or sacred. On everything and in everything it sees the stamp of inevitable decline, nothing can resist it save the unceasing process of formation and destruction, the unending ascent from the lower to the higher - a process of which that philosophy itself is only a simple reflexion within the thinking brain.

Quoted in Edmund J. King (ed.), Communist Education (Indianapolis: The Bobbs-Merrill Company, Inc., 1963), pp. 4-5.

[100] Frederick Engels, Dialectics of Nature (Moscow: Foreign Languages Publishing House, 1954), p. 311.

[101] David Joravsky, Soviet Marxism and Natural Science, 1917-1932 (New York: Columbia University Press, 1961), p. 4.

Graham.[102] Graham suggests that "Marx habitually yielded to Engels on questions of science."[103] The philosophy of science, which eventually reached Lenin through Gregory Plekhanov, is basically the same dialectical materialism worked out by Engels, therefore, and seconded by Marx.[104] Hence, the dialectical materialist viewpoint formed the basis of both Marx's and Engels' conception of history, with an emphasis on the economic determinants of each particular epoch,[105] and of their conception of science. In the former instance, dialectical materialism is the basis of a social theory of history, while in the latter instance, it serves as a theory of knowledge underlying a philosophy of science.

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[102] Loren R. Graham, "The Transformation of Russian Science and the Academy of Sciences, 1927-1932" (unpublished Ph. D. dissertation, Dept. of Political Science, Columbia University, 1964), p. 75. This dissertation was published in a somewhat revised form as The Soviet Academy of Sciences and the Communist Party, 1927-1932 (Princeton: Princeton University Press, 1967).

[103] Ibid. Indicative of Marx's secondary role in the formulation of the dialectical materialistic philosophy of science is the fact that Marx, upon reviewing the entire manuscript of Engels' Anti-Dühring, had no objections to its contents.

[104] It is not intended here to imply that the basic writings of Engels (and Marx) on the philosophy of science--namely, Anti-Dühring (written in 1877), Dialectics of Nature (written in 1873-1883), and Ludwig Feuerbach and the End of Classical German Philosophy (written in 1886)--were exempt from different interpretations up to and following Lenin's principal treatise on the philosophy of science, Materialism and Empirio-Criticism (written in 1908). For a discussion of the development of the Marxist philosophy of science, including its various ramifications and interpretations from its inception up through the 1930's, in addition to the primary sources already cited, see:

Gustav A. Wetter, Dialectical Materialism: A Historical and Systematic System of Philosophy in the Soviet Union (New York: F. A. Praeger, 1959).

H. B. Acton, The Illusion of the Epoch: Marxism-Leninism as a Philosophical Creed (London: Cohen & West, 1955).

[105] Cf. Chapter III.

primarily as conceived by Engels. It is not accidental, however, that dialectical materialism served the purposes of Marx and Engels in their philosophies of both history and science. Their late assumption of work in the philosophy of science, coming after the conclusion of their work in the philosophy of history, and their use of the same materialistic and dialectical laws to explain both social/historical and scientific phenomena serve to lend credence to the claim that Engels and Marx fit their philosophy of science to that of social history. This claim, aptly described by Graham as "the derivation of laws in history and then the shift of emphasis to science in an effort to discover the operation of the same laws there,"[106] seems justified, particularly in view of the almost superficial resemblance between explanations for changes taking place in both social history and science. Marx and Engels undoubtedly saw in such similarity the scientific substantiation of the historical laws, which govern the development of society, by the objective laws, which were discovered to govern nature. More important for the purposes of this study, however, are the implications for educational policy in a Marxist society, which this rapprochement between Marxist philosophy of history and Marxist philosophy of science appears to have had. That is, under the rubric of instruction on the general philosophical concept of dialectical materialism, it is possible to _combine_ the philosophy of history with the philosophy of science, since this concept pervades both areas. If such instruction is sufficiently pursued in practice within a Marxist educational system, then it is convenient to impress upon pupils the close alliance between socio-political ideology and science, because of their mutual adherence to the laws of dialectical materialism.

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[106] Graham, _op. cit._, p. 76.

Furthermore, in a society stressing economic development and industrialization, it is natural that the role of science, as the most efficient means or superstructure for achieving these aims, is elevated. If that society is subjected to a Marxist philosophical orientation, as is the case in the USSR, then it is not difficult to foresee how the process of education could facilitate State control of and interference in the training of mathematicians and other scientific cadres. The ideological-political objective, from the earliest years of Soviet education, was one of the three principal objectives in the teaching of mathematics--and for that matter, in the teaching of all academic disciplines at the First and Second Levels.

Was it realistic and feasible to pursue the ideological-political objective at these lower, youthful levels of education? In light of the expectation that the teacher of mathematics conduct his teaching so that the following qualities might be instilled in the students, this objective must not be regarded--so the Soviet idiom goes--as a "hare-brained scheme":

1) a materialistic world outlook
2) a sense of Soviet patriotism and pride
3) logical thinking
4) will power or the "determined qualities" (courage, persistence, independence, responsibility, accuracy, etc.)[107]

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[107] Vladimir M. Bradis, Metodika prepodavaniia matematiki v srednei shkole /Methods of Teaching Mathematics in the Secondary School/ (Moscow: Gos. uchebno-ped. izd. Ministerstva prosveshcheniia RSFSR, 1954), p. 60.

In addition, great importance was attached to ideological training in the higher educational levels and in the unique Soviet structure of special Party schools. Every facet of instruction, whether to serve general-educational, polytechnical, or ideological-political objectives, was to be in harmony with the basis of Marxism-Leninism, that is, with dialectical materialism.[108] In view of these conditions alone, there can be no doubt that the Soviet regime did attempt to control science, primarily by combining ideological-political training with scientific training. It had accepted, in theory at least, the universality ascribed to the doctrine of dialectical materialism by Engels and Marx!

## The flourishing of the "syllabi-minimum"

It is somewhat ironic that, despite the Soviet penchant to make learning practical, the 1921 syllabi, the Programs of the Seven-Year Unified Labor School, failed to work in the schools. Due mainly to their overloading with content, they proved to be too difficult and

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[108] Although the following claim, regarding the teaching of mathematics, is far-fetched in comparison with what most of the Soviet literature on the history of the teaching of mathematics indicates, it does offer an insight as to the official sentiment (as opposed to the popular sentiment), which prevailed in higher pedagogical circles at the time in Soviet Russia:

> After the October revolution a revolutionary breaking of previous conceptions of methods of mathematics takes place, and new methods based on Marxist-Leninist theory were created. In the Soviet school, concepts, algorithms, and symbols receive a dialectical-materialistic explanation. They are considered as reflections of real phenomena and processes.

"Matematika v shkole" / "Mathematics in the School" /, Pedagogicheskii slovar' / Pedagogical Dictionary /, Vol. I, 669.

"extensive" for classroom use.[109] Cherkasov suggests also that "they seriously overestimated the children's capabilities."[110] As a result, during the period in which these syllabi were the official standard, in most schools syllabi of lesser volume, the so-called "syllabi-minimum," replaced them in practice.[111] The toleration by the Soviet regime of the introduction of the "syllabi-minimum" is a testimonial to the fact that the 1921 programs cannot be regarded as "syllabi" in the strict usage of the term.

These "syllabi-minimum" were generally published by regional educational authorities, such as the Moscow Section of Public Education [*Moskovskii otdel narodnogo obrazovaniia*--previously abbreviated as MONO] and the Leningrad Municipal Section of Public Education [*Leningradskii gorodskoi otdel narodnogo obrazovaniia*--hereafter abbreviated as LGONO], for local use. They had a reduced volume of material, enabling them to be used without the need of much modification, and, thereby, to be genuinely practicable. This more realistic adaptation to the classroom, which, in turn, served to make them somewhat locally obligatory, actually enabled them more nearly to function as true syllabi, even if not on a State-wide level.

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[109] Bruce R. Vogeli, "Soviet School Mathematics--Past, Present, and Future" (Department of Mathematics, Bowling Green University, 1964), p. 7. (Mimeographed.)

[110] Cherkasov, *op. cit.*, p. 2.

[111] *Ibid.*

The 1921 syllabi and syllabi-minimum ushered in several "innovations" in the methodology of mathematics teaching.[112] The desirability of creative activity and the importance of relating the study of theoretical topics to experiences of life underscored the use of these methods. Such a focus, essentially leading to the dominating role of problem-solving in the teaching of mathematics, minimized the theoretical aspects of mathematics. This tendency not only continued, but also gained momentum in the decade that followed--so much so that by the late 1920's "little theoretical content remained."[113]

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[112] Cherkasov uses the term "innovations" in describing the methods associated with both the official and "minimum" syllabi in 1921. They included S. I. Shokhor-Trotskii's method of "expedient problems" (used in the teaching of arithmetic and geometry) and A. F. Lebedintsev's "concrete-induction" method, both of which were predicated on the use of creative activity and life experiences in studying theoretical topics. Therefore, since these "innovations" were really methods, the origins of which can be traced to the Imperial period of education, they more appropriately should be termed "restorations," which were only "innovations" in the sense that they were "novel" to Soviet education.

[113] Vogeli, op. cit., p. 8.

# CHAPTER V

# TRADITION AND CHANGE IN EDUCATIONAL POLICY AND PRACTICE (1923-1928)

## Laying the groundwork for educational change: the 1923 Education Act and its impact on practice

While Education Act of 18 December 1923 added a new dimension to Soviet educational policy, in actuality it legitimized numerous policies, which, by taking hold in practice as early as 1919-1921, had served to destroy many of the original tenets of the Unified Labor School. Three of these policies had been especially instrumental in this respect.

First, the 1923 Education Act divided the grades of the Unified Labor School so that the First Level was reduced to four grades, I-IV (including ages 8-12 years), and the Second Level was increased to five grades, V-IX (including ages 12-17 years). In this Second Level, grades V-VII and grades VIII-IX were designated as the First Cycle and Second Cycle, respectively.[1] Nonetheless, virtually this same scheme of grouping took effect two years earlier, as already indicated, with the introduction of the Programs of the Seven-Year Unified Labor School in August of 1921.

Second, its sanctioning of the undermining of the original polytechnical ideal of the Unified Labor School, by expressly calling for a vocational preparation, was by no means unprecedented. This inclination toward vocationalism was not just a product of renewed interest in the vocational/technical structure of education. Even in the structure of general education, as far back as the 1920-1921 period, the concept of polytechnical training began to be supplanted by an emphasis on the vocational orientation of academic studies, such that one critic, describing the situation at that time, declared: "*Nominally* [ italics mine ] the system continues to be called a Unified Labour School and the term 'polytechnic education' is preserved in the official name of the Education Department which administers primary education."[2]

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[1] Sergius Hessen and Nicholas A. Hans, Educational Policy in Soviet Russia (London: P. S. Kind & Son, Ltd., 1930), p. 31.

Third, the aim of the Education Act of 1923 to make the Unified Labor School an instrument of proletarian class interests was also not without precedent. As far back as 11 September 1919, the People's Commissariat of Education RSFSR published a decree, which required the establishment of Workers' Faculties [ *Rabochie fakul'tety* ], called Rabfaks, at all universities.[3] The Rabfak was an institution at the secondary level, the function of which was to prepare the new privileged class of workers and peasants for all higher educational institutions (VUZs), including universities and higher technical educational institutions (VTUZs). While Rabfaks are to be distinguished from Unified Labor Schools of the Second Level, their accelerated growth from three (with a combined enrollment of 2,149 students) in 1919 to sixty-five (30,035 students) in 1922-23[4] is indicative of the policy of increased attention to the interests of a particular class--namely, the working class or proletariat--in Soviet education up to the Education Act of 1923.[5]

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[2] *Ibid*., p. 30.

[3] "Rabochie fakul'tety" [ Workers' Faculties" ], *Pedagogicheskii slovar'* [ Pedagogical Dictionary ], Vol. II, 245-246.

[4] Fredrika M. Tandler, "The Workers' Faculty (RABFAK) System in the USSR" (unpublished Ph. D. dissertation, Teachers' College, Columbia University, 1955), p. 54.

These examples serve to show that, during the formative years of Soviet education, it was not unusual for administrative practice to precede major legislation on policy. While there appears to be a certain amount of continuity between general educational practices of 1920-21 and 1923, a comparison of many of the most important policies of the Education Acts of 1918 and 1923 shows them to be almost diametrically opposed. The following table portrays the reorientation of Soviet educational policy over this five-year span:

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[5] This increased class consciousness of Soviet education was not restricted to the RSFSR, the principal republic of the USSR. The Commissariat of Education of the Ukrainian Republic preempted Narkompros RSFSR in many areas of reform, such as in 1922, when it officially decreed that the Unified Labor School should serve primarily the interests of the working class. Hessen and Hans, *loc. cit.*

TABLE 18

A COMPARISON OF THE MAJOR POLICIES OF THE EDUCATION ACTS OF 1918 AND 1923

| Educational Policy | Education Act of 1918 | Education Act of 1923 |
|---|---|---|
| Aim of education | Preparation of a well-rounded personality by imparting a polytechnical education | Preparation of a "class conscious proletarian vocationally prepared for some definite task."[6] |
| Universal and compulsory elementary and secondary education | Compulsory education for all children aged 8-17 years | Not mentioned. Due to lack of accommodations, children of the working class receive preferential treatment in enrollments. |
| Cost of education | Free for all pupils regardless of social origin. | Free education not mentioned. Only proletarian youth educated free. Fees for non-proletarian youth even at the elementary level. |
| Religion in the school | Secularization of education, with neutrality towards religion | Secularization of education. Neutrality towards religion replaced by the prescription of atheism in the schools. |
| Educational opportunity | Single ladder system of schooling, stressing fulfillment of the individual personality, is open to all. | Needs of Party and economy stressed at expense of the individual. *De jure* existence of single ladder system. |
| Administration of education | Extreme decentralization allowing for maximum local initiative. | Extreme decentralization dropped. Autonomy of individual school replaced by strict subordination to the commissariat of education at the republic level. |
| Methods of instruction | Active and democratic. Emphasis on free, open-ended approaches to instruction. | Uniform "labor" curriculum replaces open-ended approach. Communist dogma pervades instruction. |

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[6] *Ibid.*, p. 32.

On the basis of this comparison, it is tempting to view the "pendulum effect" of early Soviet education[7] as a continuation of the tendency of Imperial education to fluctuate between periods of reform and reaction. In such a case, the Education Act of 1918 and that of 1923 would have to be classified as periods of reform and reaction, respectively. Hessen and Hans make such an evolutionary interpretation of Soviet education by comparing the ideology of the 1918 Act with the democratic Imperial tradition, while equating the overall policy of the 1923 Act with the "absolutist policy of the reactionary periods of Russian history."[8] However, a comparison of these two periods of Soviet education, if it is to have any real significance at all, must not be made only on the basis of principles set forth in the Education Acts of 1918 and 1923--that is, on the basis of educational policies which were officially espoused at these times. It must also include an assessment of the actual consequences of such policies. We observed in an earlier analysis of the Education Act of 1918 that certain of its provisions were not achieved, and could not possibly be achieved in practice.[9] The precepts of the Education Act of 1923 collectively comprised a more realistic policy. This fact notwithstanding, evidence drawn from the mathematics programs introduced in 1923 reveals some variation between general educational policy pertaining to the Unified

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[7] Cf. p. 2. The "pendulum effect" of Soviet education, as described in Chapter I, is taken to mean its movement between policy aims and the actual means for their implementation.

[8] Hessen and Hans, op. cit., p. 34.

[9] Supra, p. 133.

Labor School overall and policy governing instruction in the specific academic area of mathematics. For example, the new mathematics programs, the content and methodology of which were supposed to be in harmony with the policy set forth in the 1923 Act, were not introduced for the complete First Level until 1924. It was not until 1925 that mathematics programs for the Second Level appeared, which implies a lag behind official policy from one to two years, during which syllabi-minimum and textbooks continued to be used.

Thus, there were differences in the nature of Soviet educational policy, which was applicable to a single type of school--the Unified Labor School, depending on the domain of reference within that institution. Furthermore, regardless of the domain to which a given policy referred, this policy, in turn, was subject to modification upon its application in practice, as borne out by numerous local pedagogical collectives. According to one such collective, not only was there a delay in the introduction at the Second Level of mathematics programs, which were compatible with the principles of the Education Act of 1923, but also, the practical implementation of the 1925 programs succeeded only with great difficulty in overcoming the "wire entanglements of traditional methods, the traditional pattern of school-studies."[10] In addition, it was observed that "this very striving of the teacher to preserve the system of educational subjects, which hinders the transition to the programs of the State Scientific Council, still persisted in the Second Level."[11] Educational policy emanating from centralized State organs, therefore, while establishing a general framework within which the Unified Labor School was to function, was not necessarily reflected in the policy operating in specific areas of education, such as in the teaching of mathematics, particularly in the Second Level. Hence, even after conditions were such as to allow for the actual introduction of State-approved policies, such as the GUS programs in mathematics, in a given educational domain--the Second Level of the Unified Labor School--, institutional inertia in the form of traditional school practices, teacher reluctance, incompetence, or indifference, etc. served to compound further the delay in putting official policy into practice.[12]

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[10] I. G. Avtukhov and I. D. Martynenko, Programmy GUS'a i massovaia shkola /_ Programs of the GUS and the Mass School_7 (2d ed. rev.; Moscow: Izd. rabotnik prosveshcheniia, 1925), p. 53.

In essence, Hessen and Hans have compared two periods of Soviet history, which had a hypothetical existence in that only the nature of the educational policy pursued in each was the basis for their characterization, to two historical periods of Imperial Russian education, respectively--one of reform, the other of reaction--which actually existed. This analogy would not be misleading only if educational practice had closely paralleled educational policy for each of the given Soviet periods (1918 and 1923). For the reasons indicated, such was not the case.

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[11] *Ibid*.

[12] Educational policy, operating either within a broad or narrow context, exists *de jure*, and can only nominally be considered to exist *de facto*, even then, in a relative sense--to the extent of the actual fulfillment of its corporate principles.

## The 1923 New Programs for the Unified Labor School of the GUS

In what manner could mathematics teaching in the Unified Labor School most adequately accommodate the educational policy incorporated in the Education Act of December 1923? Still prior to the passage of this Act, the Presidium of the State Scientific Council (GUS) on 21 February 1923 decided to transfer to an integrated system of constructing educational programs, which owed its development to N. K. Krupskaia (1869-1939, the wife of Lenin) and P. P. Blonskii (1884-1941).[13]

This integrated system of education was described by the head of the GUS, the Marxist historian M. N. Pokrovskii (1862-1932),[14] in the explanatory notes to the first programs to be drawn up on such an integrated basis:

> With regard to the various subject disciplines, it must be noted that they lack a scheme, and this may cause amazement---- As regards mathematics,...mathematical information is picked up in passing during the study of problems in physics, chemistry, mechanics, and astronomy....How are we to combine this developmental mathematics, needed for an understanding of the exact

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[13] I. K. Andronov, "Polveka razvitiia matematicheskogo obrazovaniia v SSSR" /"A Half Century of the Development of Mathematics Education in the USSR"/, Matematika v shkole /Mathematics in the School/, No. 2 (March-April, 1966), 10-11. For a discussion of the role of N. K. Krupskaia in shaping Soviet education, see John T. Zepper, "A Study of N. K. Krupskaia's Educational Philosophy" (unpublished Ph. D. dissertation, University of Missouri, 1960).

[14] M. N. Pokrovskii (1862-1932) was one of the chief organizers of public education in the early years of the Soviet regime. Together with Ia. M. Sverdlov in 1918, he wrote the "Regulations for the Unified Labor School RSFSR," the first systematic statement of Soviet educational policy. (Supra, p. 128 et seq.) From its inception in 1919, he headed the GUS continuously up through 1932, and served also as the First Deputy of Narkompros RSFSR until his death in 1932.

> sciences, with the practical mathematics needed by the engineer? It is actually possible to achieve this combination.[15]

An answer to the question posed by Pokrovskii, concerning how to combine "developmental mathematics" with "practical mathematics," was partially proposed by P. Blonskii on page 13 of the same explanatory notes:

> The so-called skills and their acquisition as far as possible should not be put into separate hours and be turned into a form of some kind of lessons or exercises; these skills must be acquired in the process of re-working given material.[16]

These educational programs of the GUS, which were approved on 16 June 1923, were entitled, the New Programs for the Unified Labor School. Part I. First and Second Years of the First-Level School and First Year of the Second-Level School [Novye programmy dlia edinoi trudovoi shkoly. Vypusk I. 1-i i 2-i gody shkoly pervoi stepeni i 1-i god shkoly vtoroi stupeni].[17] The integrated system of education upon which they were predicated is synonymous with the complex system of teaching, which is based on the complex method of teaching--to be discussed later in this study.[18]

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[15] Gosudarstvennyi uchenyi sovet [State Scientific Council], Novye programmy dlia edinoi trudovoi shkoly. Vypusk I. 1-i i 2-i gody shkoly pervoi stupeni i 1-i god shkoly vtoroi stupeni [New Programs for the Unified Labor School. Part I. First and Second Years of the First-Level School and First Year of the Second-Level School] (Moscow: Gosizdat, 1923), p. 20. This quotation is taken from the section on "The Schemes of the Second Level" of the explanatory notes.

[16] Ibid., p. 13. This quotation is taken from the section on "The Schemes of the First Level" of the explanatory notes.

[17] I. Gratsianskii, "Materialy o kompleksnom prepodavanii" ["Materials on Complex Teaching"], Matematika v shkole [Mathematics in the School] (Leningrad: Izdatel'stvo Knizhnogo Sektora Gubono, 1924), Part II, p. 151. Matematika v shkole (1924), containing a collection of articles on the teaching of mathematics in both levels of the Unified Labor School, is a non-periodic publication of the Mathematics Commission of the Scientific-Pedagogical Section of the Scientific-Methodological Council of the Leningrad State Section of Public Education (L.G.O.N.O.). It is not to be confused with the regular periodical having the same title (Matematika v shkole), which is a methodological journal published bi-monthly since 1934 as an organ of the Ministry of Education R.S.F.S.R.

The effect on the teaching of mathematics of the shift to this new system of education was unprecedented in Russian educational history. With the exceptions of the Petrograd mathematics programs of 1918 and the 1921 Programs of the Seven-Year Unified Labor School, the individual treatment of the different branches of mathematics (i.e., arithmetic, algebra, geometry, and trigonometry) was uncommon. That is, it had been a generally accepted and popular practice to teach mathematics *per se*, without studying each branch apart from the others. This tendency coincided with a more dominant characteristic, which was peculiar, without exception, to all Soviet mathematics programs--that of undue emphasis on *applications* in the teaching of mathematics. Hence, in most programs, the traditionally self-sufficing importance of mathematics gave way to its importance as an instrument, which, by stressing the connection between its individual branches and the simultaneous study of them as an integrated whole in the classroom, could be used in life. The 1918 Petrograd programs and the 1921 Programs of the Seven-Year Unified Labor School excepted, it is possible to characterize the remaining mathematics programs prior to 1923 as "mathematically integrated." However, with the inception of the New Programs for the Unified Labor School in 1923, mathematics programs no longer were issued separately, although "mathematical skills" or "physico-mathematical skills,"[19] the teaching of which was to accompany the study of a given, broad theme, were delineated. Mathematics instruction was now more than just "mathematically integrated." It became in fact "topic-oriented" in its purpose, and "interdisciplinarily integrated" in its function in the learning process. Instead of bringing the whole of mathematics to bear upon real-life problems calling for a mathematical solution, for each grade during the trimester "central complexes," which were broken down into a number of interdisciplinary topics, formed the basis of study. Thus, these complexes, generally centered around some from of labor activity, were not problems relating to just one particular discipline, as had been the customary practice up to this time, but were problems, themes, or manifestations "which from the standpoint of our educational aims are significant....which are united by one general idea and are organized according to a certain system."[20] The humanities and all the sciences, including mathematics, were then related to these topics as either _necessary_ or _convenient_ to do so.[21]

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[18] *Infra*, pp. 235-239.

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[19] Avtukhov and Martynenko, _op. cit._, pp. 221 & 223.

[20] Albert P. Pinkevich, _The New Education in the Soviet Republic_, ed. by George S. Counts (New York: The John Day Co., 1929), p. 299.

[21] An explanatory note to the programs stresses that "the scheme supposes that the native language, mathematics, arts and manual work shall be used only as means of acquiring the given material." (Hessen and Hans, _op. cit._, p. 105.) The actual contents of the programs belied this intent, however, since many of the "mathematical skills" and "physico-mathematical skills," which were cited to accompany the study of a given "complex" and its associated topics, were not necessarily germane to its understanding. For example, in studying the "Significance and Origin of May Day," the "making of an estimate of the necessary materials for /the celebration of/ this holiday" (Avtukhov and Martynenko, _op. cit._, p. 223.) does not seem really pertinent to the study of this particular complex, and indeed, its inclusion borders on the superficial. Hence, the introduction of some mathematics material in the study of certain "complexes" seems more _convenient_ than _necessary_.

The New Programs for the Unified Labor School, more commonly referred to as the New Programs of the GUS /̄Novye Programmy GUS'a_7 and oftentimes shortened merely to Programs of the GUS, since they were drawn up by the Scientific-Pedagogical Section of the State Scientific Council,[22] aroused concern within the mathematics community at the time of their initial appearance in 1923. The Scientific-Pedagogical Section of the GUS admitted that "from the time of publication of the scheme of the State Scientific Council, the problem concerning the complex system of teaching in the school became pressing."[23]

Indicative of this "lukewarm" acceptance of the New Programs of the GUS is the fact that, at about this same time, the thirty-first edition of A. P. Kiselev's Elementary Algebra /̄Elementarnaia algebra_7 was published. This edition had been reworked specifically in accordance with the Second Level Programs of the Seven-Year Unified Labor School of 1921, which were to be replaced by the 1923 New Programs of the GUS.[24] A published review of the revised text even stated that the " 'Reformist Movement' in the area of the teaching of mathematics also had an effect in several respects on this latest edition."[25] The reviewer here was not referring to the movement of 1923, but rather, to the "reformist movement," which occurred in the teaching of mathematics at the beginning of the twentieth century! To the extent that they had been likened to this earlier Imperial movement, many in the mathematics community received the 1921 mathematics programs with considerable optimism. The revision of Kiselev's Elementarnaia algebra, first published in 1888, was very significant. Prior to the October Revolution, thirty editions of it had been published.[26] The thirty-first edition of 1923 marked the first Soviet edition of the text. In effect, an attempt to relate Russia's most successful and respected textbook with the most progressive period of mathematics teaching in Imperial Russian education was perpetrated on the basis of the 1921 mathematics programs. While the new 1923 Programs of the GUS were conceived as the "new look" in Soviet mathematics education, residual sentiment toward the older progressive look still persisted in no insignificant measure. This sentiment was only one reason for the generally wary acceptance of these new programs. There appear to be four other such reasons:

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[22] Gratsianskii, op. cit., p. 150.

[23] Ibid.

[24] B. Piotrovskii, Review of the 31st ed. rev. of Elementarnaia algebra /̄Elementary algebra_7, by A. P. Kiselev, Matematika v shkole /̄Mathematics in the School_7 (Leningrad: Izdatel'stvo Knizhnogo Sektora Gubono, 1924), Part II, 119.

[25] Ibid., pp. 118-119.

1) The 1921 Programs of the Seven-Year Unified Labor School, which immediately preceded them, reintroduced the spirit of the 1918 Petrograd mathematics programs in having predicated the study of mathematics on the basis of its individual branches. The New Programs of the GUS meant a sharp reversal of this trend, and as such, they appeared all the more radical in their interdisciplinary, integrated approach to mathematics teaching.

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[26] A. V. Lankov, K istorii razvitiia peredovykh idei v russkoi metodike matematiki / On the History of the Development of Progressive Ideas in Russian Methods of Mathematics / (Moscow: Gos. uch.-ped. izd. Min. prosveshcheniia RSFSR, 1951), p. 111.

2) The Scientific-Pedagogical Section of the GUS acknowledged that, "for those teaching mathematics, the question concerning the complex system acquired large acuteness on account of the excessive brevity, which served to the detriment of their clearness, of the explanatory notes of the *New Programs* on the question of mathematics."[27] In essence, there was confusion, and justifiably so, as to what was meant by the "complex system of teaching." Such a policy oversight stands in contrast to the general excellence of the explanatory notes, which accompanied the mathematics programs before this time.

3) M. N. Pokrovskii, who, with Ia. M. Sverdlov, wrote the "Regulations for the Unified Labor School RSFSR" of 1918,[28] even while attempting to justify their introduction in a note accompanying these programs, himself alluded to their unstructured approach to the study of mathematics with its possible deleterious effect on the training of scientific cadres.[29]

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[27] Gratsianskii, *loc. cit.*

[28] *Supra*, p. 185 (footnote #14).

[29] Pokrovskii's statement, in part, went as follows:

> With respect to the various subject disciplines, it must be noted that they lack a scheme, and this may cause amazement....As regards mathematics, the opinion of the most up-to-date university mathematics professors is that it is not a science with a given specific content, but that it is a type of language in which one speaks. Mathematical information is picked up in passing during the study of problems in physics, chemistry, mechanics, and astronomy. I agree that this sort of integrated technique for the study of mathematics presents difficulties, but I am not a mathematician, and this is not my opinion, but the opinion of mathematics professors,...and they say that textbooks following this system exist in England, that there are physics textbooks in which physics is combined with mathematics....

4) The first New Programs of the GUS, which appeared in 1923, were relatively incomplete. As indicated by their complete designation,[30] they applied only to the First and Second Grades of the First Level Unified Labor School and to the Fifth Grade (first year) of the Second Level School. Whereas the programs of the GUS, which appeared in 1924 as the New Programs for the Unified Labor School of the First Level for All Four Years of Instruction [Novye programmy edinoi trudovoi shkoly I stupeni dlia vsekh chetyrekh godov obucheniia], obviously covered all grades of the First Level, the Programs for the First Cycle of the Second Level School [Programmy pervogo kontsentra shkoly vtoroi stupeni], covering only the first three grades (Grades V, VI, VII) of the five grades of the Second Level, were not introduced until 1925.[31] Such a time lag in the introduction of complete programs for each level of the Unified Labor School, particularly for the Second Level, not to mention the absence of any programs whatsoever for the Second Cycle of the Second Level (Grades VIII and IX), served only to hinder their acceptance moreso.

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> How are we to combine this developmental mathematics, needed for an understanding of the exact sciences, with the practical mathematics needed by the engineer? It is actually possible to achieve this combination. Naturally, it will be necessary to combat the obstinacy of that two-legged inhabitant of the globe whom I have compared with the four-legged variety....Andronov, op. cit., p. 11.

[30] Cf. p. 186.

[31] Andronov, loc. cit.

Could the introduction of the *Programs of the GUS* in 1923-25, despite all the drawbacks delineated above, offset the appeal at this time of the Imperial "reformist movement" in mathematics teaching dating back to the turn of the century? In order to ascribe the proper significance to this "showdown" between the Soviet and Imperial educational programs, it is necessary to trace the extent to which progressive tendencies in the teaching of mathematics had developed in Imperial education.

## Progressive tendencies in the teaching of mathematics in Imperial Russia

Imperial educational policy had placed much importance on the role of the textbook in the educational process. This principle was much in evidence in the teaching of mathematics, especially from 1860 onward. With regard to the study of algebra, for example, there appeared numerous, popular textbooks between 1860-1890,[32] with A. Davidov's *Beginning Algebra* [Nachal'naia algebra], published first in 1866, dominating up through the 1880's, when Kiselev's *Elementary Algebra* [Elementarnaia algebra], the first of thirty pre-Revolutionary editions of which appeared in 1888, succeeded it as the most popular algebra textbook.[33] Notwithstanding the popularity of Kiselev's textbook, which stemmed both from the fact that it best fit the 1890 programs of the Gymnasia and that Kiselev sent prospectuses and free examination copies of it to teachers throughout all of Russia,[34] it exhibited a somewhat universal trait of all mathematics textbooks (including arithmetic, geometry, and trigonometry textbooks, as well as algebra textbooks) up to that time--the formal exposition of the course of study. As a result, sentiment concerning the reform of the teaching of mathematics gradually gained momentum in the early years of the 1890's. Such men as V. P. Ermakov, V. E. Serdobinskii, V. P. Sheremetevskii, and S. I. Shokhor-Trotskii began to attract attention to their novel ideas.

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[32] Included among the most popular algebra textbooks at this time were G. Somov's *Beginning Algebra* [Nachal'naia algebra] (1860), E. Przheval'skii's *Beginning Algebra* [Nachal'naia algebra] (1867), F. Bychkov's *Collection of Examples and Problems* [Sbornik primerov i zadach] (1868), A. Malinin's and K. Burenin's *Manual for Algebra* [Rukovodstvo algebry] (1875), and others. Lankov, *loc. cit*.

[33] *Ibid*.

As far back as 1893, Serdobinskii suggested that the "idea of functional dependence" should be the central idea of mathematics taught in the secondary school.[35] In 1895 Sheremetevskii emphasized the fact that, since all mathematics essentially relates to the study of functions, then functional dependence should be the principal unifying concept of the study of mathematics at the elementary level.[36] S. I. Shokhor-Trotskii in 1898 too recommended that the concept of functional dependence "be restored at every opportunity."[37]

The so-called "reformist movement" in mathematics teaching actually began in Russia. The occasion was the debate over a proposal in 1892 in the Moscow Society for the Dissemination of Technical Knowledge to purge the mathematics course of the secondary school "of dead weight which was accumulated for centuries."[38] However, on the Western European continent one notes numerous instances of similar reform shortly before and after the turn of the century, the following of which were the most salient:

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[34] A. Ia. Margulis, "Andrei Petrovich Kiselev," Matematika v shkole /Mathematics in the School/, No. 4 (July-Aug., 1948), 46.

[35] Andronov, op. cit., p. 3.

[36] V. P. Sheremetevskii, "Matematika i ee shkol'nye surrogaty" /"Mathematics and Its School Substitutes"/, Russkaia mysl' /Russian Thought/, May, 1895, 105-125.

[37] Lankov, op. cit., p. 71.

1897--Felix Klein, the well-known German geometer, delivered a paper at the First International Mathematics Congress in Zurich, "Problems of Mathematics Education," in which he not only criticized traditional methods of mathematics instruction, but also set forth the first principles for the reform of mathematics education.[39]

1899--L'Enseignement Mathématique, an international journal in the publication of which participated many advanced mathematics teachers throughout Germany, as well as other countries, was founded.[40]

1900--A section on education and methods of teaching mathematics, in which papers were read dealing both with the traditional and the new systems of mathematics education, was established by the Second International Congress.[41]

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[38] Sheremetevskii, loc. cit. It was in 1892 also that S. I. Shokhor-Trotskii's critique of the traditional methods of the teaching of arithmetic, The Goal and Techniques of Teaching Lower Mathematics from the Standpoint of the Demands of General Education, was published. Andronov, loc. cit.

Whereas Lankov agrees that the "reformist movement" in the teaching of mathematics began in Russia before taking hold in Western Europe, he dates its start from the 1899-1900 academic year, when "the first documents of it were published." (Lankov, op. cit., p. 127.) He does not identify these "documents," however, and simply refers to a summary of them in K. M. Shcherbina, Matematika v russkoi srednei shkole /Mathematics in the Russian Secondary School/ (Kiev: 1908). This source is not available in the United States.

[39] Andronov, op. cit., p. 4.

[40] Ibid.

1902, 1905--Reformed mathematics programs appeared in France (generally associated with Professor E. Borel) and in Germany (the Merano programs, under the direction of F. Klein), respectively.[42]

1908--The International Commission for the Teaching of Mathematics (headed by F. Klein) was created at the Fourth International Congress of Mathematicians. (L'Enseignement Mathématique became the official organ of this Commission).[43] One of its nineteen national subcommittees (headed by Academician N. Ia. Sonin) was founded in Russia.

1914--The International Conference on the Teaching of Mathematics, attended by representatives of twenty-six countries, including Russia, convened in Paris.[44]

While the "reformist movement" in mathematics teaching in Imperial Russia was acknowledged as having begun in 1892, the events cited thus far indicate that most progress in this direction at first took the form of pedagogical thought, expressed mainly in the individual writings of prominent mathematics educators. Near the turn of the century, however, a sharp increase in collective efforts toward this reform took place, as indicated by the following:

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[41] Ibid.

[42] Ibid.

[43] Iakov S. Dubnov, Besedy o prepodavanii matematiki /Discussions on the Teaching of Mathematics/ (Moscow: Izd. "prosveshchenie," 1965), p. 150.

[44] Ibid., pp. 150-151.

1899--Imperial Ministry of Public Instruction successfully proposed that all educational districts hold special conferences on questions of the reform of the secondary school.[45] All results of these conferences were forwarded to the Ministry of Public Instruction.

1900--The Minister of Public Instruction, N. P. Bogolepov, appointed a commission of about one-hundred representatives of education, which included a mathematics subcommittee headed by N. M. Bilibin. The "Bogolepov Commission" worked out educational plans for all the major types of secondary schools.[46]

1900-1908--In the Society for the Dissemination of Technical Knowledge in Moscow a group of teachers formed the Moscow Mathematics Circle, which started publication of the journal Matematicheskoe obrazovanie /‾Mathematics Education_/ in 1911.[47]

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[45] Lankov, op. cit., p. 125.

[46] Ibid., p. 126. It is on the basis of the preparation of these materials that Russia is generally accorded the distinction of having initiated the movement for reform in the teaching of mathematics at the turn of the twentieth century.

[47] A. P. Iushkevich, "Matematika i ee prepodavanie v rossii XVII-XIX vv." /‾"Mathematics and Its Teaching in Russia in the 17th-19th Centuries"_/, Matematika v shkole /‾Mathematics in the School_/, No. 3 (May-June, 1949), 4.

1903-1904--The Third Congress of Workers of Technical and Professional Education raised questions concerning the teaching of mathematics.[48]

1911-1912--The First All-Russian Congress of Teachers of Mathematics, in which there participated more than 1200 persons, including the most eminent mathematics scholars and pedagogues of the country, convened in St. Petersburg from 27 December-3 January.[49]

1912-1913--The Second All-Russian Congress of Teachers of Mathematics, in which Academician S. N. Bernshtein supported the central role of the concept of function in the secondary school, convened in Moscow (26 December-3 January).[50]

After almost a decade of collective efforts toward school reform, there eventually followed the first actual implementation by official government of projects of programs in mathematics, which had been drawn up in 1906 by a private, non-official organization, the Kiev Physico-Mathematical Society.[51] With regard to this "Kievan Project," the concept of functional dependence was to be introduced into the Gymnasia, beginning with Grade IV, while the concept of the integral and the rudiments of analytical geometry were reserved for the last classes. Whereas the Government had succeeded in reintroducing[52] the teaching of elements of analysis and analytic geometry into the Real Schools (Real Gymnasia) in 1907-1908[53] and into the military schools [*kadetskye korpusy*] of the War Department in 1911, the majority of the public secondary schools, particularly the basic mass of them--the Male Gymnasia [*Muzhskie gimnasii*]--, remained untouched by these reforms. Similar reforms succeeded in several private secondary institutions in 1908-1909, such as in the new Preobrazhenskii School in Petersburg.[54]

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[48] Lankov, op. cit., p. 127. In a report to this Congress, D. V. Roitman not only proposed placing geometry as the basis of mathematics instruction and beginning the study of algebra earlier, but also stressed that it was necessary to include the bases of differential and integral geometry in the program of the Lower Technical Schools.

[49] Ibid., p. 129.

[50] Vladimir M. Bradis, Metodika prepodavaniia matematiki v srednei shkole /Methods of Teaching Mathematics in the Secondary School/ (Moscow: Gos. uchebno-ped. izd. Ministerstva prosveshcheniia RSFSR, 1954), p. 260.

[51] Dubnov, op. cit., p. 152. The Warsaw Circle of Teachers of Physics and Mathematics and the Petersburg Pedagogical Museum of Military-Educational Institutions also drew up such projects in higher mathematics for the secondary school in 1908. Ibid.

Therefore, towards the beginning of the second decade of the present century, reforms in the teaching of mathematics were limited to a portion of the secondary schools in general, and to the teaching of the bases of higher mathematics in particular. Nonetheless, the *cumulative effect* of individual endeavors, the expansion of organized collective inquiry, and even the somewhat meagre realization of actual reforms were responsible for generating the enthusiasm which prompted the accelerated publication of new types of mathematics textbooks around 1910.

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[52] In accordance with the Regulations of 1804, the teaching of differential and integral calculus entered into the secondary-level programs of the Gymnasia from 1804-1819, while the teaching of statistics and the bases of descriptive and analytic geometry survived up until 1844 and 1845, respectively. Lankov, *op. cit.*, p. 139. Hence, the teaching of the bases of higher mathematics in 1906 amounted to a "reintroduction" of the same.

[53] The following textbooks were used in introducing these advanced mathematical disciplines in the Real Schools:

Analysis: M. G. Popruzhenko, *The Bases of Mathematical Analysis* [Nachalo matematicheskogo analiza]
Analytic geometry: D. M. Sintsov, *A Short Course in Plane Analytic Geometry for the Real School* [Kratkii kurs analiticheskoi geometrii na ploskosti dlia real'nykh uchilishch]

Andronov, *loc. cit.*

[54] Lankov, *loc. cit.*

These textbooks, written to accommodate various aspects of mathematics reforms, were restricted neither to secondary educational institutions nor to the teaching of higher mathematics in them. Their publication, within a very short period, ran the gamut of all branches of mathematics at all elementary and secondary levels, as the following list of such textbooks and certain methods texts indicates:

ARITHMETIC

| Author and Title of Book | Comments |
|---|---|
| Dmitri D. Galanin, Methods of Arithmetic, 1st Year of Instruction /¯Metodika arifmetiki, 1-i god obucheniia_/, 1910; (2nd Year of Instruction--1911). | Galanin's books emphasize the "laboratory method" of teaching. Idea of functional dependence is also brought in. |
| Introduction to Methods of Arithmetic /¯Vvedenie v metodiku arifmetiki _/, 1911. | |
| Filippovich and Mrochek, The Pedagogy of Mathematics / Pedagogika matematika_/, 1910. | Endorses the "laboratory method" and stresses combining the teaching of arithmetic with cardboard aids and excursions into the community. |
| L. V. Glagolev, The Teaching of Arithmetic by the Laboratory Method /¯Prepodavanie arifmetiki laboratornym metodam_/, 1910. | Stresses the "laboratory method." |
| E. Gorbunov and I. Tsunzer, Living Numbers / Zhivye chisla_/, 1912. | In addition to the "laboratory method," illustrations and graphic exercises receive wide application. |

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| V. G. Fridman, *Methods of Arithmetic* [Metodika arifmetiki], 1913. | "The best and most real knowledge of functional dependences should be obtained by the 'laboratory method.' " (p. 152) |
| V. A. Lai, *Manual for Initial Instruction in Arithmetic, Based on Results of Didactic Experiments* [Rukovodstvo k pervonachal'nomu obucheniiu arifmetike, osnovannoe na rezul'tatakh didakticheskikh opytov], translated under editorship of D. L. Volkovskii, 1910. | Translated German textbook, which promotes the new idea of experimental pedagogy in textbook writing. |
| I. Shteklin, *Methods of Arithmetic* (for the 1st & 2nd years of the elementary school) [Metodika arifmetiki], trans. under editorship of D. L. Volkovskii, 1913. | Translated Swiss textbook, which is based primarily on the use of visual methods and visual aids. |
| K. F. Lebedintsev, *A New Direction in the Area of Methods of Arithmetic and Its Practical Results* [Novoe napravlenie v oblasti metodiki arifmetiki i ego prakticheskie rezul'taty], 1906. | A methods text, which is based on teaching experiments of the author and accompanied by practical results. |
| N. G. Leksin, *Experiment of a Practical Manual on Methods of Arithmetic* [Opyt prakticheskogo rukovodstva po metodike arifmetiki], 1913. | Experimental text for teachers, which pertains to the second stage of the course of arithmetic and treats the material according to the graphic-laboratory method. |

## GEOMETRY

| Author and Title of Book | Comments |
|---|---|
| A. R. Kulisher, *Textbook of Geometry* [Uchebnik geometrii], 1914. | A "propaedeutic," or preparatory course of geometry,[55] designed to serve as an introductory course to be taken prior to the strict, logical study of a course of geometry. |
| N. G. Leksin, *A Propaedeutic Course of Geometry* [Propedevticheskii kurs geometrii], 1914. | A propaedeutic course of geometry containing graphical-laboratory model lessons and drawings. |
| D. V. Roitman,[56] *Course of Elementary Geometry Including the Bases of* Trigonometry... [Kurs elementarnoi geometrii so vkliucheniem nachal trigonometrii...], 1907. | Reduces considerably the geometric content of the ordinary geometry course, while stressing short, simple, and graphic methods. |

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[55] At the II All-Russian Congress of Teachers of Mathematics in December 1912, S. A. Bogomolov defined a propaedeutic course of geometry as a preparatory course having the aim of "the development of spatial intuition and the accumulation of geometrical knowledge." Lankov, *op. cit.*, p. 137.

[56] Roitman, a Petersburg pedagogue, argued that the average pupil is unable to learn the course of geometry, which has a Euclidean form, "intelligibly and with benefit." In addition, he suggested "not proving theorems, which are obvious for any pupil, when the understanding of the proof is a hundred times more difficult than the theorem itself." *Ibid.*, p. 138.

ALGEBRA

| Author and Title of Book | Comments |
|---|---|
| K. F. Lebedintsev, Course of Algebra for Secondary Educational Institutions /¯Kurs algebry dlia srednikh uchebnykh savendenii_/, Part I, 1909; Part II, 1910.<br>Bases of Algebra for Higher Elementary Schools and Commercial Schools /¯Osnovy algebry dlia vysshikh nachal'nykh uchilishch i torgovykh shkol_/, 1911. | In all of his textbooks, Lebedintsev develops the concepts of number and of functional dependence simultaneously by "passing from an abstract-deductive account to a concrete-inductive method."[57] |
| A. N. Glagolev, Elementary Algebra and a Collection of Exercises and Problems /¯Elementarnaia algebra i sbornik uprazhnenii i zadach_/, 1911. | Voluminous work (800 pages), which gives greatly detailed presentation of the concept of functional dependence. |
| D. M. Levitus, Course of Elementary Algebra for Secondary Educational Institutions /¯Kurs elementarnoi algebry dlia sredn. uchebn. zaved._/, Parts I and II, 1911-1912. | Develops concept of functional dependence by a "concentric" arrangement of the material, often replacing strict proofs with explanations and analyses of examples. |

TRIGONOMETRY

| Author and Title of Book | Comments |
|---|---|
| V. Mrochek, Rectilinear Trigonometry /¯Priamolineinaia trigonometry_/, 1908. | The first part, as evidenced by its inclusion of a rather lengthy essay (24 pages) on the historical development of the ideas of trigonometry and a thorough coverage of basic definitions and solutions of triangles, stresses the propaedeutic aspect of the course, whereas the second part includes the study |

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[57] Ibid., p. 109.

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| | of more complex trigonometric functions and equations--emphasizing their practical significance, as opposed to a purely formal exposition. |
| N. Bilibin, Course of Trigonometry /_Kurs trigonometrii_7, 1909. | Except for an even more comprehensive treatment of the history of trigonometry, it is quite similar in scope and design to the textbook of Mrochek above. |
| D. Roitman, Course of Elementary Geometry Including the Bases of Trigonometry, as Set Forth According to a Changed System /‾Kurs elementarnoi geometrii so vkliuchiem nachal trigonometrii, izlozhennyi po izmenennoi sisteme_/, 1907. | Emphasis is on the concept of a propaedeutic course of trigonometry, whereby trigonometric principles (plane and spherical) are closely connected with the study of geometry. |
| P. A. Baranov, The Solution of Triangles in the Course of Geometry With the Application of Tables of Cathetuses /‾Reshenie treugol'nikov v kurse geometrii s prilozheniem tablits katetov_/, 1910. | A propaedeutic course of trigonometry, such that the solutions of triangles are constructed using geometry ("within geometry"), while not applying trigonometric formulas--that is, trigonometry is studied in a concealed form, on the basis of geometry. |

## INTRODUCTION TO HIGHER MATHEMATICS

| Author and Title of Book | Comments |
|---|---|
| D. Goriachev, Foundations of Analytical Geometry /‾Osnovaniia analiticheskoi geometrii_7, ca. 1910.<br>Foundations of Analysis of Infinitesimals /‾Osnovaniia analiza beskonechno malykh_/, ca. 1910. | Both of Goriachev's textbooks attempt to treat the bases of higher mathematics with a minimum of formalism and narrow interpretation, while maintaining an organic connection with the general course of mathematics of the secondary school. |

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|---|---|
| [58] M. G. Popruzhenko, *Materials on Methods of Analysis of Infinitesimals* [Materialy po metodike analiza beskonechno-malykh], 1912. | Similar to the above-listed books of Goriachev in that the author attempts to stress ideas more than formulas. |

## Implications of the Imperial experience for a cycle of reform in the teaching of mathematics

*Theoretical implications.* The list above, while not intended as an exhaustive account of the mathematics textbooks published in this short interval of time, implies more than just their educational purposes with respect both to the branches of mathematics involved and to the grade levels covered. More specifically, in the development of the reform of mathematics teaching in modern Russia from the end of the nineteenth century, if, roughly speaking, the last decade of the nineteenth century may be termed the "period of individual efforts" and the first decade of the twentieth century the "period of collective thought," then the 1907-1914 period should be designated the "period of empirical literature." Of course, the designations of these periods reflect only the major type of activity carried out in them, since many of the different types of activities were carried out concurrently, especially from the turn of the century onward. The "period of empirical literature" was a culmination of individual and collective activity, wherein thoughts and ideas which survived the tests of "incubation and debate" came out in writing in the form of textbooks and related literature. We would expect the next phase in this rational and cyclic development of mathematics reform to be the "period of experimentation." The cycle of total reform in mathematics teaching would be completed when, following a complex process of adaptation and interplay between the features of reform and the needs and allowances of society, certain of these features of reform would mesh with traditional methods and content, and would then be incorporated into most mathematics programs, such that they would acquire a normative standing in the educational process. This phase might be termed the "period of mass implementation."

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[58] M. G. Popruzhenko was elected President of the First All-Russian Congress of Teachers of Mathematics in Moscow in December 1911.

This cycle of reform in the teaching of mathematics was not completed in Imperial Russia, although its first three phases clearly had evolved by the end of the Imperial regime. Is there evidence to suggest that it reached further or total fulfillment in Soviet Russia? Prior to conducting an inquiry into such a possibility, let us postulate the hypothetical existence of a complete cycle of reform in the teaching of mathematics and theoretically analyze its adaptability to and implications for the educational process. In this manner, the actual cycle of reform will be placed in a more meaningful context.

It is with the beginning of the "period of experimentation" that the reform in the teaching of mathematics passes from the idealistic syndrome of educational policy to the operational syndrome of education practice. During this "period of experimentation" the operational syndrome of educational practice is variable in nature, whereas during the succeeding and final period of the cycle--the "period of mass implementation"--the operational syndrome is no longer variable, but rather, now reflects a new educational norm.

Since the terms "idealistic syndrome of educational policy" and "operational syndrome of educational practice" are not common in pedagogical terminology, they should be clarified before proceeding further. In essence, they have been specially coined here to serve as a vehicle to portray graphically and succinctly the two distinct aspects of any educational reform relating to the teaching of an academic subject, including mathematics--namely, the idealistic or theoretical aspect of reform and the operational or practical aspect of reform.

Let us consider the first, or idealistic, aspect of reform in the teaching of a given discipline. Whether they are restricted just to the reform of teaching in a given discipline, or they are expanded to include other integral components of the educational process, such as admission policies and organizational structures of educational institutions, all such ideas, which guide the educational process in principle only, collectively comprise "educational policy." Correspondingly, the reverse is also true, that is, all educational policy is a collection of such ideas, and, therefore is idealistic in nature. If, however, the consideration of educational policy is limited to just its component of reform in the teaching of a particular academic discipline, such educational policy is not only idealistic in nature, but also, in its most complete and advanced stage, it is analogous to a syndrome. "Syndrome," in the general sense, is a pattern of concurrent or overlapping events which relate to a given phenomenon. In its particular usage here, the "given phenomenon" is reform in the teaching of mathematics, the "pattern" is educational policy, and the "events" comprising this pattern are the three overlapping periods of individual efforts, collective thought, and empirical literature. Hence, educational policy, as related to reform in the teaching of mathematics, constitutes the first stage of such reform and may be thought of as an "idealistic syndrome," which, in its most advanced stage, is the pattern emerging from the interaction and then the culmination of these three phases or periods in its development.

The explanation of the term "operational syndrome of educational practice" is based on its two fundamental distinctions from that of "idealistic syndrome of educational policy." Most apparent is the fact that, the "operational syndrome" applies to the second, or practical, aspect of reform in the teaching of mathematics. Hence, the "operational syndrome" may be viewed as the attempted application of educational reforms in practice. The other distinction concerns the fact that, with respect to the "events" in the general definition of "syndrome," the "operational syndrome" encompasses two periods in its most advanced stage of development--the period of experimentation and the period of mass implementation, which contrast markedly with those of the "idealistic syndrome." Hence, educational practice, as related to reform in the teaching of mathematics, constitutes the second stage of such reform and may be thought of as an "operational syndrome," which, in its most advanced stage, is the pattern emerging from the interaction of these two phases or periods in its development. For the sake of convenience, the "operational syndrome" may be further identified as either "variable" or "normative," depending on whether reference is made to mathematical reforms carried out during the period of experimentation or the period of mass implementation, respectively.

It is emphasized that, in the present discussion, the terms "idealistic syndrome of educational policy" and "operational syndrome of educational practice" are appropriate for use only in conjunction with this single facet of educational policy, that is, educational policy as it relates to reform in the teaching of some given discipline (i.e., mathematics). For example, with regard to educational policy in the teaching of mathematics, if we broaden the context of our consideration to mean the teaching of mathematics pro tempore, then our discussion of educational policy must encompass more than just reform in the teaching of mathematics. There has to be stipulated and distinguished the simultaneous existence of two educational policies in the teaching of mathematics, to wit: 1) "ongoing educational policy," which is normative in the sense that, to a greater or lesser extent, it directs the ongoing process of mathematics education in the classroom at the given time under consideration; 2) "emergent educational policy," which, paralleling the "ongoing educational policy" and agreed upon by a group of reform-minded individuals, is intended to supplant such ongoing (officially accepted) policy and to achieve a normative standing in the classroom at some future time. In essence, "emergent educational policy" is a purveyor of potential change in actual classroom practices in the teaching of mathematics, which is intended to replace the existing educational policy guiding such practices and to achieve normative value in its own right--thereby completing the transition from "emergent policy" to become the new "ongoing policy" guiding classroom instruction in mathematics. Diagram II on "Reforms in Teaching Within the Context of the Conduct of Educational Policy" clarifies the simultaneous existence and relationship of these two types of educational policies.[59] While the "reform cycle" in the teaching of a given discipline may be incomplete and only in an early "period" of its development, the fact remains that in the pro tempore sense, there is always some movement for change--however small. Hence, the simultaneous existence of these two types of educational policies. Obviously, by restricting educational policy to reform in the teaching of mathematics, it exists only as the second type above--"emergent educational policy."

Practical implications. We might interpret the introduction of analysis and analytic geometry into a relatively small percentage of secondary schools from 1907-1911[60] and the introduction of the Ignatiev Plan,[61] which reformed the curricula of the secondary Gymnasia, as the incipient stages of the "period of experimentation" in Imperial Russia. However, neither of these occurrences really ever got off the ground. The former was too restricted in scope. Whatever effects it had on education extended more in an upward direction, toward higher educational institutions and academic preparation for the same, rather than downward in the direction of mass public schooling and the educational process inherent therein. The latter reform, while exhibiting a potential to become operational even in the normative sense, was doomed

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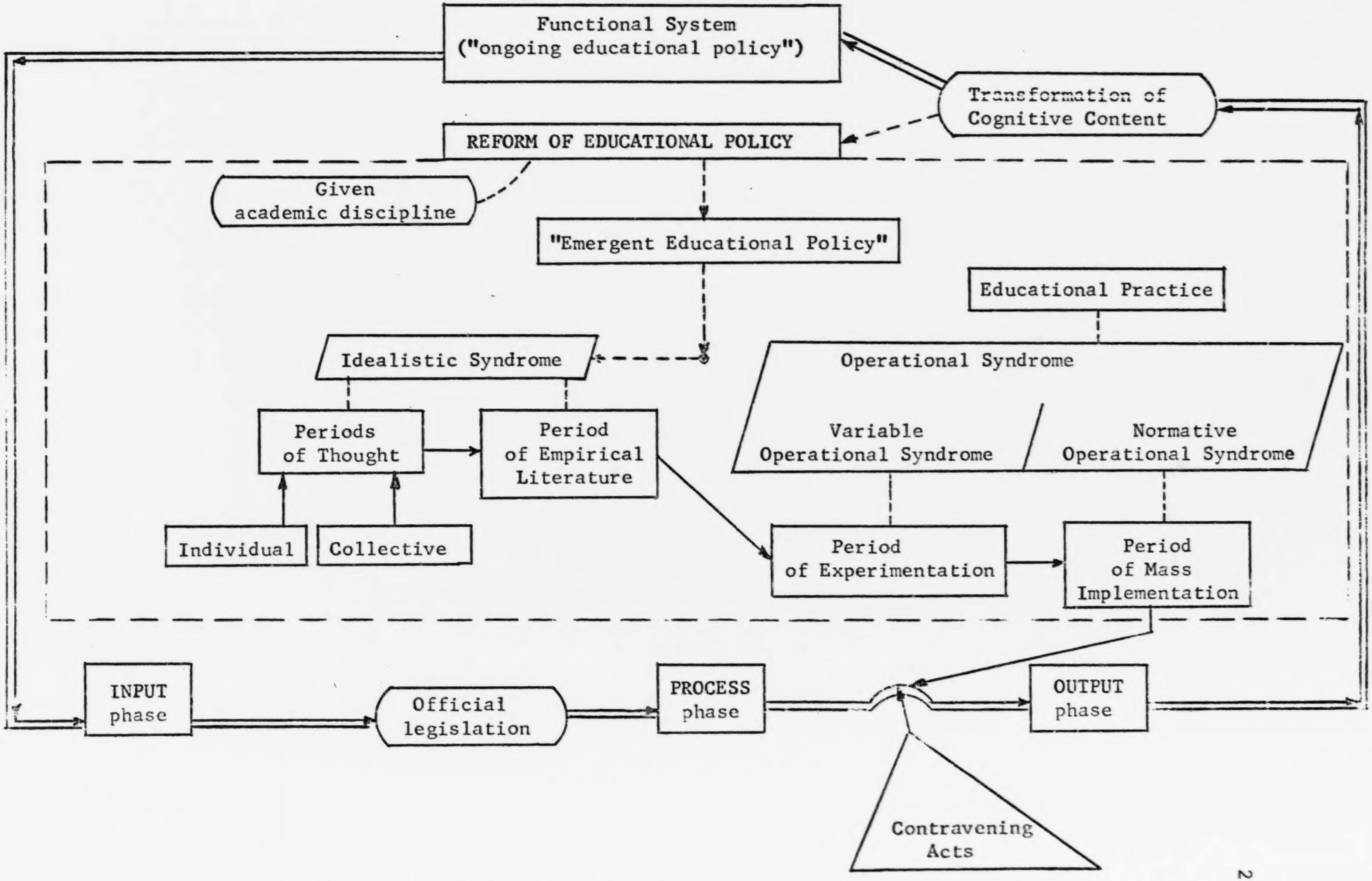
[59] Cf. Diagram I (p. 24 --"Paradigm on the Conduct of Policy in a Centralized Educational System").

[60] Cf. p. 199 (for specific types of schools involved).

[61] Supra, pp.41-42(for Ignatiev Plan).

## DIAGRAM II

## REFORMS IN TEACHING WITHIN THE CONTEXT OF THE CONDUCT OF EDUCATIONAL POLICY


Functional System
("ongoing educational policy")
Transformation of Cognitive Content
REFORM OF EDUCATIONAL POLICY
Given academic discipline
"Emergent Educational Policy"
Educational Practice
Idealistic Syndrome
Operational Syndrome
Variable Operational Syndrome
Normative Operational Syndrome
Periods of Thought
Period of Empirical Literature
Individual
Collective
Period of Experimentation
Period of Mass Implementation
INPUT phase
Official legislation
PROCESS phase
OUTPUT phase
Contravening Acts

to failure by its introduction into the educational process at an unfortunate time in Russian history.[62] Internal revolutionary movement and reaction to autocratic government policies, beginning as far back as the 1905 Revolution and steadily gaining momentum under the stimulus of the representative system of the Duma from 1906-1917, coupled with external involvement in the First World War, from 1914 up through the existence of the Provisional Government, created an unstable society, both politically and economically. There was little hope that educational policy, despite its increased liberation from the close scrutiny and interference of a government pressed by more urgent matters--hence, the greater license of its makers to deviate from traditional patterns--could realistically be implemented. Soviet educational policy in its first three years too, while contrasting sharply with traditional patterns and methods, was subject to this same limitation. Only with the quelling of internal disturbances and the stabilization of the Soviet economy, which coincided with the initiation and pursuit of the New Economic Policy in 1921, could hope be realistically held for the implementation of educational policy.

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[62] One of the dangers of "retrospective history" is the proneness of the historian to become so unilaterally involved with an issue that it is accorded a narrow or arbitrary interpretation. In this instance, while the unfortunate timing of the Ignatiev Plan appears evident, contrariwise, the conditions of the time prompted the formulation of the Ignatiev Plan and the principles guiding its construction. (Supra, p. 68 .) That is, reaction to autocratic controls and popular discontentment served to free pedagogical thought from complete dominance by the Imperial Government, so that liberalization of educational policy, as was imminent with the introduction of the Ignatiev Plan, could take place.

And so it was. The 1921 Programs of the Seven-Year Unified Labor School were not only progressive in their overall conception, but also, due to the fact that they were drawn up on the basis of the traditional separation of mathematics into its individual branches, with the exception of the Petrograd programs,[63] they were more realistic than the mathematics programs introduced during 1918-1920. More specifically, this realistic nature of the 1921 programs stemmed from two reasons: first, the teachers, the vast majority of whom, having received their training in Imperial educational institutions, were trained for and experienced in teaching mathematics according to its individual branches; second, the 1921 programs lent themselves to a more practicable and feasible utilization of existing mathematics textbooks and literature, which were almost exclusively of Imperial origin, and as such, similarly treated mathematics according to its traditional subdivisions.

The Programs of the Seven-Year Unified Labor School of 1921, however, are not primarily important for their contrast to earlier Soviet mathematics programs of the People's Commissariat of Education RSFSR, with respect both to their organizational treatment of mathematics and to their adaptability to existing resources. Their prime significance, rather, stems from their close correspondence with reforms in mathematics education in the "period of empirical literature" of 1907-1914.[64] Whereas the proliferation of mathematics textbooks and materials of this period never passed beyond the idealistic syndrome of mathematics education reform in Imperial Russia, only in the Soviet era, with the inception of the 1921 programs in mathematics, did such activity find its partial fulfillment in practice! Due mostly to the overloading of these programs, their emphasis on "pedagogical maneuvering," and the abolition of examinations in the educational process of the Unified Labor School, "they were scarcely realized anywhere completely in school practice."[65] They may be ascribed, then, to the "variable operational syndrome" of educational practice, since their partial realization in practice approximated a "period of experimentation,"[66] wherein no genuinely normative standard was established. Certainly the aforementioned revision of Kiselev's popular Elementary Algebra /Elementarnaia algebra/ in 1923 so as to reflect the basic principles of mathematics reform of these 1921 programs was one measure, which had the potential to help elevate them to the "normative operational syndrome" of educational practice.[67] It represented a belated endeavor to give the 1921 programs what they lacked in order to reach this final phase whereby the cycle of total reform in mathematics teaching would be completed--stability in the sense of greater delineation of the quantitative content of the programs.

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[63] As already indicated, the model plan for mathematics programs, published in 1918 by the Petrograd Commissariat of Public Education, also retained the division of mathematics into its different branches. Cf. p. 152.

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[64] This correspondence of the mathematics reforms of 1907-1914 with the mathematics programs of 1921, as evidenced in the mathematical literature of that period, is based on their following similarities in principle:

1) The study of mathematics according to its individual composite branches with the arrangement of the given material in a definite system.
2) The minimization of formalism in the study of mathematics, e.g., very little emphasis on "problems of substantiation" (proofs), as opposed to stress on intuitive understanding.
3) Emphasis on and development of the idea of functional dependence.
4) Freedom of "pedagogical maneuvering" in the teaching of mathematics, with a concomitant minimization of a specific core of mathematical knowledge for which the pupil is held responsible.

[65] N. N. Nikitin, "Prepodavanie matematiki v sovetskoi shkole 1917-1947 gg." /"Teaching of Mathematics in the Soviet School, 1917-1947"/, Matematika v shkole /Mathematics in the School/, No. 5 (Sept.-Oct., 1947), 15.

[66] Supra, p. 206.

The 1921 Programs of the Seven-Year Unified Labor School were the product of the cumulative development of reforms in the teaching of mathematics, which clearly had antecedents in Imperial Russian education. While they never underwent a "period of mass implementation," their portent for the teaching of mathematics in Soviet Russia should be recognized, as the following assessment of them would indicate:

> If the development of mathematical ideas in the area of teaching would have continued to go in the same direction, it is highly possible that in practice acceptable norms with regard to the general volume of the programs would have come, and Soviet methods of mathematics would have followed the path of quick and natural development. But in the following period of time other ideas triumphed, which found their expression in the so-called programs of GUS, which were adopted by the Board of Narkompros 5 March 1923. These programs in essence led to the abolishment of separate subjects in the school and called for the construction of work in the school on absolutely different principles.[68]

Hence, there was a high degree of continuity in the contents and methods of mathematics instruction between Imperial Russia of the twentieth century and early Soviet Russia, particularly in the first years of the period of the New Economic Policy (NEP). Notwithstanding the fact that the reforms in mathematics education in late Imperial education were restricted to the idealistic syndrome of educational policy, they must be considered to be the structure upon which the superstructure of the Soviet programs of 1921 (the partial implementation of which allows classifying these reforms within the operational syndrome of educational practice) was based. Because of the close correspondence between numerous reforms in Imperial literature in the teaching of mathematics and their subsequent incorporation into the 1921 mathematics programs, continuity between Imperial Russian ideas and Soviet Russian practices in mathematics education existed in all branches of mathematics at almost every level of elementary/secondary education. Indicative of this continuity was the appointment in 1921 to the Kiev Institute of Public Education of K. F. Lebedintsev,[69] in conjunction with which this prolific writer of arithmetic and algebra textbooks in the Imperial "period of empirical literature" drew up the first educational plan of the Ukrainian Unified Labor School and the first mathematics program for the Seven-Year [Unified Labor] School.[70]

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[67] Supra, pp. 208-209.

[68] Nikitin, op. cit., p. 16.

In the theoretical discussion of "emergent educational policy,"[71] it was pointed out that, in the teaching of the academic disciplines, activity for change--however small--runs parallel to the educational policy directing the ongoing process of instruction in the schools. Whereas in Imperial Russia Lebedintsev was one of the chief instigators of policy for reform in the teaching of mathematics, which contrasted with the ongoing policy in mathematics instruction at the time, during the early Soviet period, he became one of the prominent policy-makers of the ongoing policy of mathematics teaching in the schools. In short, the elevation of Lebedintsev to a position of official responsibility coincided with the advancement of progressive educational policy in the teaching of mathematics from the category of proposals for future reform in late Imperial education to that of policy, which was to guide the ongoing process of mathematics instruction in Soviet education in 1921. Within a short period of time, the work of the "reformists" in mathematics education had progressed from charges of "destruction of rigor" and "destruction of the scientific character of exposition"[72] in the Imperial period, to official policy enjoying not insignificant, even if short lived (1921-1923) and non-uniform acceptance in the Soviet period.

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[69] As an indication of Lebedintsev's prominence among the authors of reform-oriented textbooks in the last decade of Imperial Russia, cf. pp. 200-205 (for representative list of such textbooks of that time), esp. pp. 201, 203.

[70] Lankov, op. cit., p. 109.

[71] Supra, p. 209.

## Programs of the GUS and the deterioration of the textbook

The tendency of the Programs of the State Scientific Council from 1923-1930 to replace textbooks with social work, as the principal basis for instruction in mathematics, ran counter to the long established tradition of marked dependence on the textbook. However, it was not without precedent in Soviet education. While a nihilistic attitude toward traditional mathematics textbooks is evident from the abundance of progressive-type textbooks written in the Imperial "period of empirical literature," shortly after the Soviet assumption of power, a vociferous ultra-liberal faction extended this attitude to include mathematics textbooks *per se*. In the July 1918 issue of *Matematika v shkole* /‾Mathematics in the School_/ O. A. Vol'berg[73] openly admitted that a subject cannot be mastered by the student without a textbook, but rationalized the abolition of the textbook by identifying independent activity, not the assimilation of knowledge, as the foremost aim of the educational process.[74]

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[72] Lankov, op. cit., p. 110.

Proponents of the abolition of textbooks welcomed the negative effect of World War I and of the subsequent civil war on the availability of textbooks. Not only did textbooks rapidly diminish in number, but also, until the early twenties, conditions were highly unfavorable for textbook writing. The quality of the textbooks that were published was usually poor. In the epilogue of one mathematics textbook, published in 1922, the author's apology for its content realistically depicts the conditions of the time:

> The author begs the pardon of the readers....for whom much, such as the lack of formulas, the absence of drawings, and the brevity of the account, perhaps, is not understandable. But for his excuse the author must point to, on the one hand, the condition of spiritual and even physical trouble when this book was written, which some of the representatives of the intelligentsia were not able to endure in the spring and summer of 1919, when this book was written (fairness requires, however, to state that the author was not drawn to unloading firewood and even received a "child's" ration, and, on the other hand, to the insufficiency of paper of publishers.[75]

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[73] O. A. Vol'berg at the time was the Chairman of the Mathematics Section of the School Reform Bureau (*supra*, p. 145).

[74] O. A. Vol'berg, "Neskol'ko slov ob uchebnikakh" /‾"Several Words About Textbooks"_/, *Matematika v shkole* /‾Mathematics in the School_/, No. 1 (July, 1918), cited by Andronov, *op. cit*., p. 10.

[75] A. V. Vasil'ev, *Tseloe chislo*/‾The Whole Number_/ (Petrograd: Gos. izd., 1922), pp. 264-265.

Even after material conditions of Soviet society began to improve as a result of the economic stimulation of the New Economic Policy, the place of the textbook in the process of education never achieved its pre-Revolutionary status. In 1924, when the construction of Soviet schools reached unprecedented heights and the adoption of the Programs of the GUS, with their emphasis on the "complex" as a totally new concept in methods of teaching, started to go into full swing, the future of the textbook really became precarious.[76] A dilemma faced Soviet educational policy-makers: if the textbook was to retain a significant role in the school, it would have to undergo a complete metamorphosis in relation to the new principles of teaching espoused by the State Scientific Council; on the other hand, if the textbook continued to offer a formal, detailed, and highly structured account of some particular branch of mathematics, then it no longer would be commensurate with the educational policy of that time. As a dysfunctional, hence, unnecessary component of the educational process, the textbook, at least in its traditional context, would then disappear from use. In actuality, however, neither alternative was chosen to the exclusion of the other.

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[76] In describing the plight of the textbook in the educational process, Soviet literature avoids the use of so strong a term as that of "precarious" here. For example, the Pedagogical Dictionary [ Pedagogicheskii slovar' ] depicts the situation as follows: "In the first years of the Soviet school, under the influence of petty-bourgeois conceptions, especially the theory of 'liberal training' and pragmatic pedagogy, the role of the textbook was *underestimated*." (Italics mine.) "Uchebnik" [ "Textbook" ], *Pedagogicheskii slovar'* [ Pedagogical Dictionary ], Vol. II, 534.

The textbook was neither abolished nor did it remain immune to change.[77] In mathematics, for instance, the term *uchebnik*--"textbook", while not abandoned, no longer was restricted to its traditional connotation of the formal and detailed systematization of knowledge in a given branch of mathematics. The new programs based on the "complex method" of instruction were not favorable to the creation of textbooks in the traditional sense of the term.[78] Instead, there appeared so-called workers' books, "loose" textbooks /‾"rassypnye" uchebniki_7, journal-textbooks, and even newspaper-textbooks,[79] which aimed to make materials drawn from real life the formal vehicles of instruction. In addition to this expansion of the traditional concept of the textbook /‾*uchebnik* _7, another category of textbooks came into vogue in the mid-twenties. Under the term *posobie* (another designation for "textbook") were grouped reference literature and books, which were intended mainly for independent study and out-of-class reading--two important principles of the "complex system" of teaching. The basic difference between the two categories of textbooks, as they relate to the study of mathematics, continues to remain up to the present. Whereas *uchebnik* denotes a textbook for the students' personal use in conjunction with some specific program of study in mathematics, the posobie is relatively thicker in size and more comprehensive in content, more difficult for the student to comprehend, and most often is retained in a library on a reference basis.[80] The revised concept of the uchebnik and the more pronounced and discriminate use of the posobie as a supplementary, yet integral, means of the study of mathematics, were the expedients by which Soviet educators side-stepped the need to create a new Soviet-type of textbook, while simultaneously retaining the textbook concept in the teaching of mathematics.

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[77] Indicative here of the general lack of resolve of the textbook dilemma by educational policy-makers are such open-ended statements as the following:

> "The school is for many now found in the process of searches,--and in the process of searches there too should be the creation of textbooks for it. And it is difficult to say now,--whether textbooks for the new school, at least in that form in which we got accustomed to them, are generally even necessary."

V. A. Aleksandrov, *Novye puti k tekhnicheskoi shkole* /‾New Paths for the Technical School_7 (Moscow: Gos. tekhnicheskoe izd., 1924), p. 30.

While this statement was made with respect to the technical school, it pretty much expresses the prevailing sentiment found in the literature on education at the time towards textbooks generally.

[78] "Uchebnik" /‾"Textbook"_7, *Pedagogicheskii slovar'* /‾Pedagogical Dictionary_7, Vol. II, 534.

[79] *Ibid.*

This failure to introduce a uniquely Soviet textbook served to arouse apprehension on the parts of some leftist educators that Imperial textbooks, which were still in existence, would be utilized in the schools. They narrowly interpreted Lenin's statement that, "we in the whole line of educational work are not able to stand on the old point of view of indifference of education to politics /‾apolitichnost'_/ and to stage educational work outside of the connection with politics."[81] Imperial textbooks were not only criticized for not promoting Soviet ideology, but also, for their bourgeois, metaphysical, and idealistic content. However, due to the minimization of the role of the textbook in the educational process, particularly with the advent of the

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[80] Aleksandrov, loc. cit.

[81] Quoted in I. K. Luppol, "Problema kul'turnoi revoliutsii i zadachi nauchnykh rabotnikov" /‾"The Problem of the Cultural Revolution and the Tasks of Scientific Workers"_/, Nauchnyi rabotnik /‾Scientific Worker_/, Nos. 5-6 (May-June, 1928), 52.

*Programs of the GUS* in 1923, and Lenin's realistic admonitions not to forsake the heritage of bourgeois society, the subject of non-Soviet textbooks degenerated into nothing more than a target for Soviet political propaganda.

Perhaps the greatest activity in this regard occurred during the 1925-1929 period, when Soviet nationalism was on the upswing as a result both of the stabilization of the Soviet economy via the New Economic Policy and the initiation of the First Five-Year Plan of industrial development. The topic of the working-out of a "proletarian culture" aroused much controversy at the time in political journals, such as *Bol'shevik*, the official organ of the Central Committee of the All-Union Communist Party (VKP[b]).[82] In essence, the concept of "proletarian culture" amounted to a revision of Lenin's theory of cultural revolution, wherein Lenin stressed that the bourgeoisie and the inherited bourgeois culture were to serve as the basis for the building of socialism.[83] The concept of "proletarian culture" recognized

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[82] For a first-hand account of the controversy on the building of a "proletarian culture," see:

Anonymous, "Reviziia Leninskoi teorii kul'turnoi revoliutsii" ["Revision of Lenin's Theory of the Cultural Revolution"], *Bol'shevik* [Bolshevik], No. 15 (1925), 66-77.

A. Slepkov, "Zametki chitatelia o literaturnykh teoretikakh" ["Notes of the Reader on Literary Theorists"], *Bol'shevik* [Bolshevik], No. 16 (1925), 58-65.

G. Deev-Khomiakovskii, "Bezrabotitsa sredi nauchnykh rabotnikov" ["Unemployment Amongst Scientific Workers"], *Nauchnyi rabotnik* [Scientific Worker], No. 10 (Oct., 1928), 53-57.

[83] Cf. p. 117 (footnote # 26 ). As additional evidence that the concept of "proletarian culture" was antithetical to Leninism, consider the following words of Lenin in delivering the "Political Report of the Central Committee" of the VKP(b) on 27 March 1922 at the Eleventh Congress of the Russian Communist Party:

> We know how the services of the bourgeoisie were enlisted in 1918 [laughter]; so there is no need for me to go into

the existence of two separate and distinct cultures--that of the proletariat and that of the bourgeoisie. One of its advocates, A. Bogdanov, went so far as to suggest that both a proletarian and a bourgeois mathematics existed, and that the exact sciences of the proletariat even had a methodology, based on the principles of class, different from that of the bourgeoisie.[84] These differences in methodology, in turn, were to be reflected in a manner of instruction peculiar to both groups, such that "instead of a wide cultural training based on the bourgeois inheritance in the exact sciences, a course of hothouse 'proletarian cult' is outlined."[85] Accordingly, the language and content of the proletarian course of mathematics generally, and of the accompanying mathematics textbooks or instructional literature in particular, would have to reflect this class bias through a genuine compatibility with Soviet ideology and proletarian culture. Such a strict interpretation of the concept of proletarian culture, therefore; in the words of one of its proponents, in practice meant that:

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details. We are using different methods now to enlist the bourgeoisie. But here is the conclusion he / Alexander Todorskii / arrived at: 'This is only half the job. It is not enough to defeat the bourgeoisie, to overpower them; they must be compelled to work for us.'

Now these are remarkable words, remarkable words which show that even in the town of Vesyegonsk, even in 1918, there were people who properly understood the relation between the victorious proletariat and the vanquished bourgeoisie....

The idea of building communist society exclusively with the hands of the Communists is childish, absolutely childish. Vladimir I. Lenin, Selected Works, Vol. II, Part 2 (Moscow: Foreign Languages Publishing House, 1952), p. 657.

[84] A. Slepkov, "Zametki chitatelia o literaturnykh teoretikakh" / "Notes of the Reader on Literary Theorists" /, Bol'shevik / Bolshevik /, No. 16 (1925), 59.

[85] Ibid.

> ...In order to utilize the work of one or another scientific instructor of mathematics having his own textbook in the past, it will be necessary to make a 'translation' of the whole work into the language of our days. This, of course, they are able to do and do little.[86]

As already indicated, however, this concept of proletarian culture never gained actual popular acceptance. Furthermore, the bulk of activity and debate on this matter, relatively insignificant as it was, took place with regard to training at higher educational institutions.

Soviet educational policy managed to skirt the creation of a new, uniquely Soviet type of textbook as well as the controversy of a "proletarian culture," so that activity with regard to both issues was rather marginal. Such "disengagement" helps to explain why definitive educational policy regarding textbooks was not forthcoming until the passage of the resolution of 12 February 1933 "On Textbooks for the Elementary and Secondary School,"[87] according to which the textbook resumed its traditional place of importance in teaching generally, and in the teaching of mathematics specifically.

## Attempt by the GUS to entrench its own programs

The introduction of the New Programs of the GUS in 1923 marked the advent of a new phase in the development of Soviet educational policy. However, as indicated earlier in our discussion, it was not until the appearance of the 1924 New Programs for the Unified Labor

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[86] G. Deev-Khomiakovskii, "Bezrabotitsa sredi nauchnykh rabotnikov" /"Unemployment Amongst Scientific Workers"/, Nauchnyi rabotnik / Scientific Worker/, No. 10 (October, 1928), 55-56.

[87] "Uchebnik /"Textbook"/, loc. cit.

School of the First Level for All Four Years of Instruction and the 1925 Programs for the First Cycle of the Second Level School[88] that complete programs were introduced in all grades of the elementary school and in the first three grades (Grades V-VII) of the secondary school, respectively. The significance of these programs stemmed largely from two factors: first, they displaced the 1921 Programs of the Seven-Year Unified Labor School, which, we shall recall, bore a close resemblance to the late-Imperial movement for reform in the teaching of mathematics-- whose historical antecedents seemed almost to defy disentrenchment; second, while they did not precipitate the creation of a peculiarly Soviet type of textbook, they called for, and thereby legitimized, the reduced role of the textbook in the educational process. In short, the Programs of the GUS drastically reoriented Soviet educational policy in relation to the teaching of all disciplines, especially mathematics.

Such a drastic revision of Soviet policy in the teaching of mathematics could only be brought about by curtailing the progressive influences of twentieth-century Imperial Russia, which had taken hold. In effect, this curtailment implied a sharp reduction in the influence of the textbooks and methods books emanating from or associated with this movement. This course of action was precisely what the State Scientific Council decided upon. That is, it published a list of State-approved textbooks and methods texts in 1923, which in mathematics amounted to the following numbers of books in its various branches:[89]

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[88] Cf.p.192 (for transliterated Russian titles of the 1924 and 1925 Programs of the GUS).

[89] Anatolii Ia. Podzemskii, Spravochnaia kniga po narodnomy prosveshcheniiu / Reference Book on Public Education / (Moscow: Izd. "Krasnaia nov'" glavpolitprosvet, 1923), pp. 96-98.

| Branches of Mathematics | Number of Textbooks | Number of Methods Texts |
|---|---|---|
| Arithmetic | 19 | 8 |
| Algebra | 10 | None listed |
| Geometry | 20 | None listed |
| Trigonometry | 6 | None listed |
| General & Higher Math | 6 | 4 |

Of the progressive textbooks of twentieth-century Imperial Russia listed earlier,[90] the "approved list" above included the following books by category:

| Branches of Mathematics | Textbooks | Methods Texts |
|---|---|---|
| Arithmetic | None | Lai, Rukovodstvo k pervonachal'nomu obucheniiu arifmetike (translated by D.L.Volkovskii, ed.)<br>Shteklin, Metodika arifmetike (translated by D. L. Volkovskii, ed.) |
| Algebra | None | None |
| Geometry | None | None |
| Trigonometry | None | None |
| General & Higher Math | Goriachev, Osnovaniia analiticheskoi geometrii<br>Goriachev, Osnovaniia analiza beskonechno malykh | |

Whereas the list of progressive textbooks of twentieth century Imperial Russia was compiled as a representative sampling of progressive mathematics textbooks and methods texts published during the 1907-1914 "period of empirical literature," a comparison of all such books published in that interim likely would further substantiate the tendency of Soviet educational policy purposefully to curtain all twentieth century Imperial Russian influences, with two minor exceptions. The exceptions were those methods texts originating in a foreign country (i.e., the texts of Lai and Shteklin, originating in Germany and in Switzerland, respectively) and several textbooks relating to the teaching of higher mathematics in Grades VIII and IX of the Unified Labor School (i.e., the textbooks of Goriachev). The rationale for each of these exceptions is easily explained. The early Soviet educators not only borrowed liberally from a wide assortment of foreign thinkers, but also translated numerous non-Russian works on education.[91] This borrowing included methods texts on the teaching of mathematics, many of which had been translated in Imperial Russia under the editorship of D. L. Volkovskii. The rationale for the acceptance of certain Imperial textbooks on higher mathematics is more obvious, since the Programs of the GUS did not cover Grades VIII and IX of the Second Level.

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[90] Cf.pp.200-5 (for sampling of progressive textbooks of twentieth century Imperial Russia).

In opposition to its glaring exclusion of twentieth century Imperial textbooks and methods texts in mathematics generally, however, stands the inclination of the GUS to include many of the popular late-nineteenth century textbooks on its 1923 "approved list," such as Shokhor-Trotskii's Methods of Arithmetic /̄Metodika arifmetiki_7, Kiselev's Elementary Algebra /̄Elementarnaia algebra_7 and Davydov's Beginning Algebra /̄Nachal'naia algebra_7, Rybkin's Collection of

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[91] William W. Brickman, "The Historical Setting After the Revolution," The Changing Soviet School, ed. George Z. Bereday, William W. Brickman, and Gerald Read (Cambridge: The Riverside Press, 1960), p. 55.

*Geometry Problems* [Sbornik geometricheskikh], and Przheval'skii's *Analytic Geometry and Collection of Problems on Analytic Geometry* [Analiticheskaia geometriia i sbornik zadach po analiticheskoi geometrii].[92] Of the category of GUS-approved trigonometry textbooks, ostensibly there were no significant ones listed, which were published in the nineteenth century. However, N. Rybkin's *Plane Trigonometry* [Priamolineinaia trigonometriia], first published in 1894, is known to have been enormously popular even in the Soviet period.[93] It seems feasible, therefore, to conclude that its omission from the list was unintentional, particularly since both Rybkin's less popular geometry and solid geometry textbooks were among those approved. The publication of the tenth edition of Przheval'skii's *Plane Trigonometry and Collection of Trigonometry Problems* [Priamolineinaia trigonometriia i sbornik trigonometricheskikh zadach] in 1923,[94] the same year in which the GUS-approved list of textbooks and methods books in mathematics appeared, also makes its exclusion from the list circumspect. Regardless of such minor inconsistencies, however, there is one important consideration here. That is, in 1923, the year in which the first of the *Programs of the GUS* appeared, a high regard for the more formal textbooks and methods texts of nineteenth century Russian education with a simultaneous deprecation of those materials related to the mathematics reform movement of the early twentieth century was very prevalent.

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[92] Podzemskii, *loc. cit.*

[93] Bradis, *op. cit.*, p. 407. The publication of the twenty-sixth edition of the Rybkin text in 1948 attests to this popularity.

[94] *Ibid.*, p. 408.

Hence, there was little precedent in Russia for the actual implementation of the Programs of the GUS,[95] which, with their predication upon the "complex method" of teaching, bypassed nearly three decades of progressive development in the teaching of mathematics. Their hasty adoption demonstrates well the degree of authority entrusted to the State Scientific Council of Narkompros RSFSR by this time. A measure of the powerful influence of the GUS is the fact that its programs officially remained in effect until the monumental decree of the Central Committee VKP(b) of 5 September 1931 "On the Elementary and Secondary School,"[96] which, as indicated in Chapter III, marked the turning point of the movement toward quality in Soviet education.[97] This power of the GUS notwithstanding, the Programs of the GUS were increasingly subjected to criticism and modification.

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[95] While the Programs of the GUS were unique in the practice of Imperial and Soviet education, they were based on the "complex method" of study, which was analogous to the concept of synthetic study, for which there was much precedent in the writings of non-Soviet educators. Similar to the "complex method," the synthetic method "means that in the primary school the starting point should be not the abstract, systemically arrayed scientific subjects, but the actual life which surrounds the child, undivided into various disciplines." (Hessen and Hans, op. cit., p. 106.) Hence, as do Hessen and Hans (p. 106), one may point not only to the works of Western European educators (i.e., Kerschensteiner,Decroly, and Ferriere) and American educators (i.e., Dewey), but also to the writings of such Imperial Russian educators as Tolstoi, Ushinskii, and Shatskii in discounting the "complex method" as a contribution peculiar to Soviet Russian educators.

[96] Bradis, op. cit., p. 40. The Programs of the GUS lasted officially until the promulgation of this decree. Unofficially, however, they lasted roughly until the beginning of 1932, in accordance with the stipulation in the 5 Sept. 1931 decree that allowed the passage to new educational programs to proceed somewhat later on 1 January 1932. Nikitin, op. cit., p. 19.

[97] Supra, pp.123-4 (footnote #37).

### Shortcomings of the first GUS programs

Generally speaking, the degree of success of these programs declined with each succeeding concentration of grades of the Unified Labor School.[98] That is, a relative comparison of the programs at the different grade levels indicates that they were carried out most completely and successfully in the First Level, with much difficulty in the first concentration of the Second Level, and not at all in the second concentration of the Second Level. If, on the other hand, they are evaluated in absolute terms, then it is plausible to classify all of the Programs of the GUS, particularly as they were introduced originally and prior to their subsequent modification, as failures. The lack of realism in their conception resulted not only in their incomplete implementation in the classroom, but also in their generally poor quality of preparation of students both for higher educational training and for jobs in the wanting economy directly upon graduation from the Seven-Year School.

What were some of the shortcomings inherent in the initial programs of the GUS, which precipitated the appearance of the new Programs and Notes on Methods for the Unified Nine-Year Labor School /Programmy i metodicheskie zapiski edinoi deviatiletnei trudovoi shkoly_7 in 1926/1927?[99] The preponderance of correspondence, which poured into the teachers' own *Uchitel'skaia gazeta* [Teachers' Journal] [100] as early as 1925 concerning these programs, offers a realistic and comprehensive assessment not only of their inherent weaknesses, but also of the educational policy of the GUS generally.

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[98] The three concentrations of the complete Unified Labor School, as already indicated, were: 1) the First Level (Grades I-IV); 2) the first concentration (or First Cycle) of the Second Level (Grades V-VII); 3) the second concentration (or Second Cycle) of the Second Level (Grades VIII-IX).

[99] Andronov, op. cit., p. 12.

Correspondence submitted to the *Teachers' Journal* indicated that one major shortcoming of the GUS programs was the lack of preparation by the entire academic community for the teaching of them.[101] For this reason alone, a significant percentage of the teachers did not wholeheartedly accept them.[102] The situation was somewhat reminiscent of many teachers' reluctance to adapt themselves to the educational programs introduced in 1918-1920, due primarily to the incompatibility of the latter with the teachers' educational background and training prior to the Revolution.[103]

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[100] The *Uchitel'skaia gazeta* [Teachers' Journal] began publication in October 1924 as an organ of the Ministry of Education RSFSR and the Central Committee of the Trade Union of Workers of Education [Profsoiuz rabotnikov prosveshcheniia]. From 1930-1936 it was retitled *Za kommunisticheskoe prosveshchenie* [For Communist Education] only to resume its original title in 1937. Its purposes were (and are) chiefly to answer questions concerning the building of the school, the training and instruction of school-aged children, and the pedagogical education, life, and work of school teachers. "Uchitel'skaia gazeta" ["Teachers' Journal"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II, 545-546.

[101] A. Bagretsov, "O chem pishut v 'Uchitel'skuiu gazetu' " ["Concerning What They Write in the Teachers' Journal"], *Rabotnik prosveshcheniia* [The Worker of Education], No. 1 (January, 1926), 28.

[102] Correspondence to the *Uchitel'skaia gazeta* [Teachers' Journal] indicated that "another part of the teachers still has doubts, still does not believe that the new programs are better than the old, still fears entirely and completely abandoning the old tried and tested ways." *Ibid.*

[103] *Supra*, p. 144.

A second weakness of the programs stemmed from the compulsion of the teachers, who did attempt to adopt the programs, to modify them so as to make their implementation in the classroom more complete and practicable, while at the same time satisfying the fundamental academic requirements of an industrializing society. The problem essentially was how best to surmount the problem of coordinating the technical skills of mathematical calculation, writing, and reading with complex themes.[104] A dilemma confronted the teachers here: on the one hand, increasing numbers of parents assailed them with complaints charging that the teaching of skills was extremely neglected;[105] on the other hand, the attempts of teachers to impose skills had a commensurately negative effect on the study of the "complex." The solution of the dilemma was not readily forthcoming. "Is it necessary to apportion separate lessons for skills? Is it sometimes possible to sacrifice the wholeness of the complex for the sake of acquiring skills?"[106]

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[104] Bagretsov, loc. cit.

[105] Bagretsov succinctly, but vividly, described the situation: "...and the parents call names and yell that in the school they teach nothing." Ibid.

Interestingly enough, official explanations attached to the Programs of the GUS and the Mass School [Programmy GUS'a i massovaia shkola], the corrected and supplemented syllabi published by the GUS in 1925, did not disclaim this relative neglect of the teaching of skills in the "complex system" of teaching, as evidenced by the following instructions: "But it [the 'synthetic method'] allows more to the independence of the children, and it is exactly reading and writing that must take place chiefly through independent studies by the children." Avtukhov and Martynenko, op. cit., p. 30.

On the other hand, these explanatory notes did attempt to refute the claim of certain elements of the population, who were disturbed by this lack of teacher involvement in the teaching of marketable skills, that the school was isolated from the population, that is, from society itself. The usefulness of these programs to society, however, was not defended on the basis of their inculcation of marketable academic skills, but rather, on the basis of student performance of socially useful work. Thus, it was stated: "The especially strong connection with the population takes place through the condition whereby the school helps the population with its own work (sanitation inspection, organization of day nurseries and children's gardens, and the like)." Ibid., p. 29.

[106] Bagretsov, loc. cit.

Such were the questions asked by and dealt with differently by responsive teachers, since direction and guidance even from government school inspectors was lacking. Involved here was the manipulation of both the content and the method espoused by the new programs. There came to exist so many new methods, and:

> ---the differences between them /‾were_/ sometimes so insignificant, their value in the eyes of the teacher at times so low or so hazy, that he finally lost 'methodological perspectives,' and entangled himself in the labyrinths of these new methods...while independently groping for new ways.[107]

The result was unavoidable: an amazing lack of uniformity and consistency in carrying out the programs.

A third principal defect of the Programs of the GUS had to do with textbooks, the purpose of which, as already indicated, was to serve as reference materials, that is, as textbooks in the "posobie" sense.[108] Time and time again, teachers complained of the unsuitability of the textbooks received by them. For example, urban schools often received textbooks designed primarily for use in rural schools,[109] textbooks written by different authors for use in the same classroom or course ("hybrid" mixtures of textbooks), and different editions of the same textbook -- ranging from pre-Revolutionary to Soviet editions, the contents of which often varied due to revision and change. While the poor standing of textbooks during this stage of the development of Soviet educational policy was partly attributable to the lack of material means of the People's Commissariat of Education RSFSR, it resulted primarily from an educational policy endorsing the secondary role of textbooks in the educational process. The State Scientific Council considered the strained state of finances as an inducement for adopting such a policy, since reality itself becomes the textbook--the principal one at least--under the synthetic method of study.[110] The implications for the lack of uniformity in school practice of such a policy are obvious. In an attempt to compensate for this loose attitude toward textbooks and to make them more compatible with the Programs of the GUS, some teachers created "collective textbooks" with the help of rank-and-file workers of the community on the basis of the assorted materials at their disposal.[111] This action, however, was able to arouse little support on the part of the GUS, which advocated the elimination of problems books of a general type in all schools.[112] In their place, according to the explanatory or methodological notes attached to the programs, there were to appear books stressing practical studies in mathematics. These books were to be created by each school on its own behalf, as a result of which, they were reckoned to be adapted both to the needs of the new school and to local conditions.

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[107] Ibid.

[108] Supra, pp. 220-21 (for discussion of the posobie).

[109] Supra, p. 323 (additional comment on the existence of and distinction between urban and rural Unified Labor Schools).

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[110] The State Scientific Council so reconciled its policy concerning textbooks with the poor material conditions existing, that the latter condition was portrayed as a blessing in disguise! The official rationalization of the GUS went as follows:

> Obstacles of material and ideological means are likewise pointed out. The insufficient material equipping of the school, the poor provision of the teacher, the insufficient supply of schools with textbooks, - all these were objective obstacles; they, on the contrary, as was already stated, were significantly eased by the introduction of the synthetic method, which acquaints children with first-hand reality, where formerly they were acquainted with it at best by models and pictures, and at worst from words of a pedagogue (if they made his acquaintance, which was rare); reality itself becomes the textbook. Avtukhov and Martynenko, op. cit., p. 29.

[111] Bagretsov, loc. cit.

[112] Nikitin, op. cit., pp. 16-17.

The fourth, and final, major shortcoming of these programs, which perhaps was the most important, was the mistaken notion in Soviet pedagogy that the resemblance between its "complex method" and the "synthetic method" of pedagogy in the West[113] was perfect. The "complex method" deviated from the "synthetic method" in one crucial respect: it abolished the study of separate subjects in the educational process. This interpretation was a significant aberration of the orthodox "synthetic method" of study, which was premised not on the abolition of the separate disciplines, but only on their interdependence and coordination.[114] Nonetheless, at no point in the explanations attached to its programs did the GUS acknowledge the disparity between the two methods. The ambivalence associated with these two methodological concepts and its implications for Soviet educational policy calls for a more comprehensive treatment of this matter.

## "Complex system" versus "synthetic method" of teaching

While the GUS introduced a new and different term, the "complex" method," into Soviet educational policy, the meaning attached to it was generally considered to by synonymous with the traditional term, the "synthetic method," as evidenced by the indiscriminate, interchangeable use of the two terms in the explanations accompanying the Programs of GUS. The "complex method" was instituted as a protest against the subject system of teaching of the old school. The latter was described as having suffered from the "shredding of teaching," the "separateness of individual subjects," and the stifling of the students' reasoning by their strict adherence to textbooks and the knowledge contained therein.[115] In place of the usual school disciplines of mathematics, history, literature, and the like, there "are pushed to the forefront three principal objects - nature, labor, and society, which have nothing in common with the ordinary school subjects."[116] Mathematics and the other disciplines, and even manual work, were recognized as having no intrinsic value in and of themselves. The individual discipline possessed value and was useful only as it became a part of the pupil's problem-solving apparatus or aided his understanding of a "complex." Even higher educational institutions required a knowledge of the "system of mathematics" and not just a knowledge of the "development of mathematics."[117] These explanations, while recognizing the existence of scientific methods of study peculiar to the various disciplines, decried the old methods of study in the school, wherein teachers rarely related these methods with one another while the pupil engaged in problems of learning. In order to emphasize the concept of synthesis in the new school, in fact, the GUS even preferred the term "synthetic method" over that of "complex method":

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[113] Supra, p. 229 (footnote # 95).

[114] Hessen and Hans, op. cit., p. 106. These authors add: "The synthetic method was advocated in the West as a reaction against the passively dogmatic learning of the different subjects, but not as an abolition of the scientific division into different disciplines." Ibid.

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[115] Avtukhov and Martynenko, op. cit., p. 31

[116] Ibid.

[117] Ibid., p. 62.

> ...The term complex /slozhnyi/ is vague, diffuse. For the given method the most exactly characteristic term is synthesis /sviazyvanie/, in contrast to that of analysis, which prevailed in the old school. The old school only sorted out and analyzed, leaving the more difficult--synthesis--to the forces of the students themselves. The new school emphasizes the necessity of synthesis--of binding together.
>
> Therefore, the term synthetic (sviazyaiushchii) is more suitable.[118] (Italics mine.)

However, in referring to the actual implementation of its programs, the GUS no longer confined its remarks to the method of teaching such programs. Its explanations stressed that teaching entails more than just a methodology. That is, they distinguished between the latter and the system of teaching the programs--namely, the "complex system" of teaching. Whereas the old school stressed only method--an analytical method known as the "subject system" of teaching, the "complex system" of teaching of the new Soviet school "was characterized chiefly by the fact that it is both a system of arranging material and a system of studying it."[119] (Italics mine.) Correspondingly, this "system of studying" the material was the "synthetic method," while the "system of arranging" it was based on the concept of the "complex."

Let us investigate these two components of the "complex system" of teaching further. First, with regard to the "synthetic method," it "investigates concrete reality, and not individual scientific systems, individual educational subjects."[120] Included in this system of study

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[118] Avtukhov and Martynenko, op. cit., pp. 22-23.

[119] Ibid., p. 23.

[120] Ibid., p. 24.

(or general methodology), stressing the gathering of information from several sciences and combining their different research methods, were such particular methods of teaching as the excursion, labor, the laboratory, illustrations, and graphic methods, as well as formal exercises.[121] Second, with regard to the "complex" arrangement of the material studied in the classroom, the more tangible component of the "complex system" of teaching, the attachment of importance to the _individual_ academic subjects too (similar to the pluralistic emphasis of the "synthetic method") was rejected. Therefore, the material studied was not arranged on the basis of individual academic disciplines. On the contrary, it was arranged around some aspect of reality, which took the form of a general "core-idea" (_ideia-sterzhen'_) or central theme.[122] This broad single theme was a composite of lesser topics, referred to in the educational policy of the GUS as "idea-organisms" or "organism concepts" (_idei organizmy_).[123]

In essence, the assumption of the GUS was that the teaching of the old school, with its sole emphasis on method, lacked a system. Conversely, the teaching of the new school amounted in its view to more than a method ("synthetic method")--it was a system of teaching. It was precisely this endeavor of the GUS to attach equal significance to the arrangement of the material to be studied by the "synthetic method" that resulted in its perversion of the western conception of the

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[121] _Ibid._, p. 29.

[122] _Ibid._, p. 23.

[123] _Ibid._

"synthetic method." As already indicated,[124] western interpretations, while acknowledging this method as incorporating the methods of all the disciplines, saw it as a means of investigating each of the disciplines separately. The GUS, in having sought to apply it to "complexes," each of which subsumed a number of disciplines, destroyed the integrity of the individual disciplines as areas for study in and of themselves in the educational process. As such, it did not change the method itself, but only the focus of such method. A glance at one of the specific "complexes" studied in the classroom in Appendix II shows that one epistemology merely replaced another one--that is, the Soviet-Marxist epistemology, manifested as it was in "complexes" with Marxist political connotations, displaced the traditional "bourgeois system" of knowledge, with its division into separate disciplines. Whereas the bourgeois epistemology had practicable implications for the classroom, particularly if based on the "synthetic method" of teaching, Soviet epistemology idealistically assessed the manner in which knowledge could be transmitted--that it could be inextricably tied to political-ideological objectives. This idealism was evident from the failure of the Programs of the GUS to be implemented in practice.

## Challenging the authority of the GUS--the sobering effect of educational failure and the counterthrust of independent activity

The appraisal of Lunacharskii, the People's Commissar of Education, offered no false delusions as to the success of the Programs of the GUS:

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[124] Supra, p. 229.

> The majority of schools teach the old subjects, but they consider that they are applying the complex method, because they include among other subjects some 'complex.' Their curriculum is for instance: arithmetic, reading, writing, and 'sheep'....'Sheep' appears to be a 'complex'; they sacrifice 'sheep' to the new method and teach as they used to do.[125]

The cumulative effect of all the shortcomings of the initial GUS programs, collectively referred to by the Soviets in retrospect as "program fettishism,"[126] was to expose the educational policy formulated by the GUS as *de jure*, due to its failure to become functional *de facto*.

While the *Programs and Notes on Methods for the Unified Nine-Year Labor School* [Programmy i metodicheskie zapiski edinoi deviatiletnei trudovoi shkoly] of the GUS in 1926/1927 officially superceded the first *Programs of the GUS*, introduced in 1923-1925, numerous compromises before then had already rendered the latter effete by modifying many of their original tenets. For instance, "very soon after the introduction of the new programs [1925 *Programs for the First Cycle of the Second Level School*] the authorities, acknowledging the impossibility of teaching mathematics and physics according to the complex method, allowed the teaching of these two subjects and chemistry 'outside the complex'."[127] Native language, geography, and literature similarly were restored as independent subjects in 1926 following the issuance of a circular by the Moscow Commisariat of Education near the end of 1925, which called for the introduction of special lessons in foreign languages, such that they were "to be freed from an artificial and arbitrary connection with the complex theme."[128] Furthermore, at the Fifth Congress of Directors of Education, which was convened that same year in May-June in Moscow, a significant number of those attending condemned the programs of the State Scientific Council.[129]

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[125] Hessen and Hans, *op. cit.*, p. 108. This evasion of educational policy also took other forms, such as:

> The most usual 'complexes' are 'the October Revolution,' 'Lenin,' 'the First of May' and the like. Fixed to special periods in the year these 'complexes' are worked out by teachers and pupils and are paraded before the Inspectors. During the rest of the year, however, the old subjects are taught in the old way. *Ibid.*

[126] Bagretsov, *loc. cit.*

[127] Hessen and Hans, *loc. cit.* Andronov is less specific in identifying the time lag associated with the first instance of teaching "outside the complex" (as to that of "very soon..." above), stating only that "the artificiality of the new complex programs became evident." Andronov, *loc. cit.*

The auxiliary role of all academic disciplines generally, and of mathematics in particular, was epitomized in the explanatory notes attached to the 1924 First Level programs describing how to combine the study of "complex" topics with the study of mathematics:

> Mathematics should not be studied in the school as an alienated self-contained subject: it should be an exercise of children in calculation and measurement of real things studied by them.
>
> Such a course of work compels us therefore to repudiate a strict system and gradual development of mathematical ideas and skills, as this was in the old school and as this often occurs now.
>
> While subordinating mathematics to life, while considering its role auxiliary, we make use of its language, its symbols in order to understand, to transform this life.
>
> Therefore, for us in mathematics there is put to the forefront not the rigor of its proofs, but their clearness and simplicity.[130]

The implications of such an educational policy in the teaching of mathematics had a far-reaching effect on the mathematical preparation of school children. It was soon discovered that even the barest minimum of mathematical material could not be fitted within the narrow confines of a "complex" theme. The result was that whole sections of mathematics had to be discarded.[131] It is little wonder that within a few years disillusion set in!

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[128] Hessen and Hans, loc. cit.

[129] Ibid.

[130] Nikitin, op. cit., p. 16.

If the subordination of mathematics to practical problems met with difficulty and resistance at the elementary level of the Unified Labor School, then how much more incompatible was a similar policy for Grades V-VII of the Second Level.[132] The most frequent criticism of the programs at this level, which was voiced especially by instructors of higher educational institutions, was their negative effect on the mathematical preparation of pupils. Their haphazard exposure to and chance acquaintance with not only the logic and structure of mathematics, but also the skills of mathematics--in essence, their lack of mastery of a definite system of mathematical knowledge through no fault of their own--could only result in augmenting the alarm expressed at the elementary level.

In view of the criticism levelled at the initial GUS programs, the appearance in 1926/1927 of the Programs and Notes on Methods for the Unified Nine-Year Labor School as their replacements did not come unexpectedly. What was surprising, rather, was the token attempt of the GUS to rectify the dissatisfaction expressed over its programs. Its Programs and Notes... represented only a new edition of its former programs, and, despite various improvements and additions, in no way can be construed as the needed revision of them.[133] It was at this point that the recalcitrance of the Soviet pedagogical community again reasserted itself. Just as the Moscow and Petrograd Sections of Public Education had compensated for deficiencies in the programs created by the School Reform Bureau during 1918-1920 by publishing their own local syllabi,[134] so too was the hegemony of the GUS in the teaching of mathematics challenged by local initiative when it failed to respond adequately to criticism.

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[131] Ibid., p. 17.

[132] The resemblance of educational policy in the teaching of mathematics in the First Cycle of the Second Level to that of the First Level is apparent from the following explanatory note of the GUS:

> School mathematics does not have its own self-contained aims. The place of mathematics in the school is determined by how much mathematics helps to carry out the general aims of training. Mathematics in and of itself has no educational value in the school, mathematics is important only so far as it helps to solve practical problems. Hence, it follows that in the program in mathematics there should be no place for such things, which have solely theoretical value. It is necessary to remember that the school does not prepare mathematicians, the school has the aim of turning out people practically prepared for life. Ibid.

The plethora of individual deviations in actual classroom practice from educational policy established by the GUS notwithstanding, some of which have already been indicated, the first locally organized movement in response to the apparent lack of leadership by the GUS was that of the Leningrad State Section of Public Education (L.G.O.N.O.). In 1925 the Educational-Pedagogical Section of the Scientific-Methodological Council L.G.O.N.O. published its Programs-Minimum of the Unified Labor School /Programmy-minimum edinoi trudovoi shkoly] for the Second Level.[135] Unlike most of the organized efforts of local educational commissariats subsequent to it, which, similar to State-sponsored programs, ordinarily dealt only with the First Cycle (Grades V-VII) of the Second Level, these replacements for the traditional, yet progressive, 1921 programs of the State [in this case, the Glavsotsvos] covered all grades (VI-IX)[136] of the Second Level. An even greater peculiarity of these programs, which was to stand in sharp contrast with later endeavors of local educational reform, was their purpose to make local educational policy more closely approximate to that laid down by the State (the GUS). Whereas these later endeavors sought to compromise various aspects of the GUS programs, the *Programs-Minimum...* represented a genuine attempt to promote the policy of the State in every respect, such as changing the content of programs to conform with the new official tasks ascribed to the secondary school and incorporating the latest Soviet pedagogical thought and practices into such programs, with one major exception. This exception was the reluctance of the Leningrad State Section of Public Education to endorse the "complex system" of teaching. On the contrary, in an explanatory note to the program of the course of arithmetic, algebra, and analysis, it was proposed that "it represented a further development of the program of 1921, and that the general guiding tenets, which were adopted then during the compiling of the program, remained unchanged;...."[137] Nonetheless, considering that, at the time of the introduction of the L.G.O.N.O. programs, the first programs of the GUS for the secondary school (the 1925 Programs for the First Cycle of the Second Level School) had yet to appear, this inconsistency takes on much less significance. The chief importance of the Programs-Minimum..., therefore, was that they served as a program transition between the traditional-progressive programs of 1921 and the "complex" programs of 1925. Indicative of the intervening nature of these programs was their orientation toward the "necessity of having to enrich the students with the mathematical concepts, methods, and skills necessary for understanding surrounding life and for the solution of practical problems, which are suggested by the techniques of different branches of labor."[138]

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[133] Andronov, loc. cit.

[134] Supra, p. 143.

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[135] Nauchno-Metodicheskii Sovet Leningradskogo Gubono Uchebno-Pedagogicheskaia [Scientific-Methodological Council L.G.O.N.O. Educational-Pedagogical Section], *Programmy-minimum edinoi trudovoi shkoly* [Programs-Minimum of the Unified Labor School], Chast' I-Vtoraia stupen' [Part I-Second Level] (Leningrad: Izd. Knizhnogo Sektora L.G.O.N.O., 1925), p. 1.

[136] It is interesting to note that in contrast to the generally accepted breakdown of grades stipulated by the Education Act of 1923, whereby the First and Second Levels included Grades I-IV and V-IX, respectively, in the programs of the L.G.O.N.O. the First Level included Grades I-V and the Second Level included Grades VI-IX.

Subsequent expressions of local initiative, which were organized in response to the policy of the GUS, served more to change and to correct such policy than to augment it! The Moscow Section of Public Education (M.O.N.O.), for example, took the earlier cue of the Leningrad State Section of Public Education (L.G.O.N.O.). In 1927 it published its Programs-Minimum for the V, VI, and VII Years of Instruction [Programmy-minimum (V-VII gody obucheniia)].[139]

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[137] Nauchno-Metodicheskii Sovet L.G.O.N.O., op. cit., p. 139.

[138] Ibid., pp. 139-140.

[139] Nikitin, op. cit., p. 18.

Other sections of public education also conducted work analogous to that of the M.O.N.O.,[140] that is, work which was centered around the construction of more practicable and locally oriented mathematics programs, thereby freeing teachers of mathematics from the coordination of educational material with any "complex" whatsoever.[141] For instance, the inspector of Narkompros characterized the work of schools of the Ural oblast (province) in 1926/1927 as follows: "Under the construction of the plan produced for the physics-mathematics cycle, the aims of compulsorily coordinating the individual disciplines with the general complex are usually not pursued."[142] Concerning the work of the Nine-Year School named Korolenko in Sverdlovsk, he added that "the teachers of mathematics were successfully engaged with the abolition of former deficiencies and strived to provide pupils with a systematic and thorough mathematical knowledge."[143]

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[140] Ibid.

[141] F. F. Korolev, T. D. Korneichik, and Z. I. Ravkin, Ocherki po istorii sovetskoi shkoly i pedagogiki 1921-1931 /_Essays on the History of the Soviet School and Pedagogy 1921-1931_7 (Moscow: Izd. Akademii Pedagogicheskikh Nauk RSFSR, 1961), p. 175.

[142] Arkhiv Minprosa RSFSR, f. Glavsotsvosa /_Archives of the Ministry of Education RSFSR, entry of Glavsotsvos_7, op. 6, sv. 4, ed. khr. 31, 1. 23, cited by Korolev et al., pp. 175-176.

[143] This systematic and thorough mathematical knowledge included:

In Grade V: course of arithmetic came to an end and elements of algebra were mastered;

In Grade VI: systematic study of the course of algebra was begun--monomials, polynomials, square of the sum and square of the difference, and simplest equations; course of geometry--lines, angles, triangles, polygons, and the like;

In Grades VII-IX: study of systematic courses of algebra, geometry, and trigonometry was continued.

Ibid., p. 176.

F. F. Korolev, a prominent historian of the Soviet school and pedagogy of present day U.S.S.R., not only cites the drawing up of separate plans and work programs in arithmetic, geometry, algebra, and trigonometry in the schools, but also emphasizes that "mathematics fell from the complex even there, where the complex system of teaching was applied."[144] Difficulty in implementing the concept of "fusionism," as stipulated by the "complex"-oriented programs of the GUS, forced the teaching of mathematics "outside the complex" even in many secondary educational institutions, where the GUS programs were generally adhered to!

The experience of the Unified Labor School with the "complex" Programs of the GUS from 1923-1925 had demonstrated that the development of mathematical skills, habits, and thinking was not able to be carried out by chance in connection with one or another "complex," but rather, required a definite system with its own specially apportioned time.[145] In correcting the defects and "unnecessary enthusiasms"[146] found in the GUS programs, the overall effect of these organized, yet isolated and uncoordinated efforts was not only in an official sense to make manifest the breach between educational policy of the State and its actual practice, but also to support the further expansion of the disparity, which unofficially had existed since their inception as a result primarily of the inclination and preparation of individual teachers, as well as of the conditions under which they labored.

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[144] Ibid.

[145] Ibid., p. 175.

[146] Nikitin, loc. cit.

Thus, the intransigence of the State Scientific Council in making fundamental revisions in its programs provoked change in educational policy from below. While the explanatory notes to the M.O.N.O. programs indicated that they were predicated on the re-edited 1926/1927 GUS programs, the changes incorporated in them were such as to give the GUS programs "an absolutely different character."[147] The same might be said regarding the changes incorporated by other sections of public education. Taken collectively, by the start of 1928 the major achievements of these local modifications of the State programs included:

1) the stipulation of a compulsory minimum of knowledge and skills in mathematics, which was obvi ed by the almost universal reference of the various sections of public education to their programs as "Programs-minimum...";
2) a less extreme interpretation, especially in the First Cycle of the Second Level, of the undesirability of mathematics as a self-contained subject, such that "later it is shown in detail how one should rationally combine arithmetic, algebra, and geometry with the phenomena of life and the complexes",[148]
3) the publication of more comprehensive notes on methods to accompany the GUS programs already issued for Grades I-IV,[149] thereby providing more effective guidance for their implementation

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[147] Ibid.

[148] Andronov, loc. cit.

[149] There were introductory or explanatory notes to the original GUS programs for the First Level. Nikitin, op. cit., p. 16. The emphasis here, however, is on the higher quality ("more comprehensive") of the methods notes accompanying the corrected and supplemented editions of the programs.

(e.g., the work, already cited, of I. G. Avtukhov and I. D. Martynenko, Programmy GUS'a i massovaia shkola /̅Programs of the GUS and the Mass School_7 (2d ed. rev., 1925), which was a corrected and supplemented edition of the original Programs of the GUS);

4) the preservation in the Second Cycle of the Second Level of the general educational subjects, particularly of mathematics, "outside the complex," even if they were ascribed a somewhat vocational emphasis as a concomitant of their orientation toward a given vocational bias.

### The symbiotic nature of Soviet secondary education during the "period of the capture of the school by the Party": the "escape" of the Nine-Year School

It is quite tempting, on the basis of undertakings of the State with regard to Grades I-VII of the Unified Labor School (Seven-Year School), to accept the designation of the 1921-1931 period in the history of Soviet education as the "period of the capture of the school, the pupil, and the teacher by the Party."[150] However, it appears to this writer that such a connotation fails to account for the peculiar developments in Grades VIII and IX of the Unified Labor School, which distinguished the Nine-Year from the Seven-Year Unified Labor School.

It should not be inferred from the absence of "complex" programs for Grades VIII and IX (Second Cycle) of the Second Level that the GUS remained completely oblivious to their function and importance in the Soviet educational system. The most probable reason for the conspicuous lack of attention to this senior concentration of the Second Level was the acceptance of the Seven-Year Unified Labor School as the principal type of general educational school. Nonetheless, the Nine-Year School did continue to exist relatively immune to the educational policy of the GUS "complex" programs, although endeavors too were made to introduce the "complex" into them. However, such attempts suffered complete failure.[151]

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[150] George S. Counts, The Challenge of Soviet Education (New York: McGraw-Hill Book Company, Inc., 1957), p. 60.

The major aspect of the educational policy, which guided the functioning of this Second Cycle during the prominence of the "complex" (1924-1931), was the attachment to it of one of several practical "biases." In other words, into these grades were introduced subjects, which were geared toward preparation of the student in a given specialty[152]--the particular grouping of subjects for a given specialty comprising a "bias." The usual biases, by type, were: 1) pedagogical, 2) co-operative, 3) administrative-Soviet.[153]

A lone exception to the tendency of restricting these biases to the final two grades of the Nine-Year School (Second Cycle), however, did exist. This exception was in connection with the programs, touched upon earlier,[154] which the Scientific-Methodological Council of the L.G.O.N.O. drew up. Unlike the programs of the GUS, which were worked out on the basis of Grades I-VII of the Seven-Year (thus, exempting the Second Cycle, Grades VIII and IX, of the Second Level), these programs covered the entire Second Level (i.e., the Nine-Year School). Correspondingly, in the L.G.O.N.O. programs, all the Second Level grades (VI-IX),[155] which were not divided into two concentrations as were those of the GUS, were joined together into one of several biases, instead of just Grades VIII and IX. Besides the "non-bias" or general program of studies, three other types of biases characterized the L.G.O.N.O. programs of the Second Level: 1) the communal bias, 2) the industrial-technical bias, and 3) the agricultural-cooperative bias.[156] Other than to confirm the arrangement of these programs by separate disciplines, the following comparison of these programs of the L.G.O.N.O. shows that the emphasis on mathematics was about the same for all biases--hence, illustrative of the survival of the Imperial and early-Soviet sentiment wherein the study of mathematics itself was deemed to have general educational value, if only for utilitarian reasons:

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[151] Nikitin, op. cit., p. 18.

[152] Ibid.

[153] Ibid.

[154] Supra, pp. 243-244.

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[155] Supra, p. 244.

[156] Nauchno-Metodicheskii Sovet L.G.O.N.O., op. cit., pp. 3-5.

TABLE 19

WEEKLY NUMBER OF HOURS ALLOCATED TO MATHEMATICS IN SECOND LEVEL EDUCATIONAL PROGRAMS OF L.G.O.N.O. ACCORDING TO BIAS (1925)[157]

| Type of Bias | Classes | | | | | | | | Total for Second Level | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | VI | | VII | | VIII | | IX | | | | |
| | # hrs math | Total hrs | # hrs math | Total hrs | # hrs math | Total hrs | # hrs math | Total hrs | # hrs math | Total hrs | % |
| Non-bias | 5 | 30 | 4 | 31 | 4 | 31 | 5 | 28 | 18 | 120 | 15% |
| Communal | 4 | 30 | 4 | 31 | 4 | 31 | 4 | 28 | 16 | 120 | 13.3% |
| Industrial-technical | 5 | 31 | 4 | 30 | 4 | 29 | 5 | 30 | 18 | 120 | 15% |
| Agricultural-cooperative | 5 | 30 | 4 | 31 | 4 | 31 | 3 | 28 | 16 | 120 | 13.3% |

One needs only to recall the curricula for the Gymnasia set forth in the 1916 Ignatiev Plan[158] to ascertain that there was a precedent in Imperial educational policy for the "bias" concept. However, the 1916 plan included only a mathematics bias (or track), which, in turn, was available just to mathematics majors of the Real Gymnasia.

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[157] Table 18 compiled from data in Tables A, B, V, G in Nauchno-Metodicheskii Sovet L.G.O.N.O., *Programmy-minimum...* [Programs-minimum...] (1925), pp. 3-5.

[158] *Supra*, p.42 (Table 5 for Secondary School Curricula Under the Ignatiev Plan, 1916).

The plurality of biases offered in the Second Cycle of the Unified Labor School, therefore, is more reminiscent of the specialties or special cycles, which came to characterize the organization of the Physico-Mathematical Faculty of Moscow University in 1915.[159] Such resemblances tend to substantiate the conjecture that the upper grades of the secondary school in both Imperial and Soviet Russia shared a common principal aim: the preparation of pupils for instruction in higher educational institutions(VUZs).

Whereas the vocational "bias" and the "complex" were generally comparable in that both concepts were extremely pragmatic means to achieve utilitarian ends, *the specific natures of the ends sought by the given institutions in which each concept prevailed* (i.e., the "complex" in the Seven-Year School [Grades I-VII] and the "bias" in the last cycle of the Nine-Year School [Grades VIII-IX] *were entirely antithetical*. That is, if the "complex" prepared the pupil for life in general, then, conversely, the "bias" prepared him for a particular specialty. This paradox suggests that, despite Soviet willingness to experiment and to compromise the integrity of the fundamental disciplines in the Seven-Year School, the last two grades of the Nine-Year School were held in relative abeyance, although they were noticeably vocationally oriented with their emphasis on the "bias." Ostensibly the disparity in the types of activity pursued in the First Cycle (Grades V-VII) and in the Second Cycle (Grades VIII-IX) resulted from the inability of the State Scientific Council to come up with an appropriate version of the "complex" for the final two grades of the Nine-Year School. In actuality, it was the result of a conscious endeavor, however implicitly pursued, to retain as the principal function of these grades the preparation of qualified students for universities and other VUZs.

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[159] *Supra*, p. 69 (Table 8 for Organization of the Physico-Mathematical Faculty of Moscow University, 1863-1915).

Official documentary evidence on Soviet educational policy, which corroborates the existence of this dual role of the two concentrations of the Second Level of the Unified Labor School, appears to be lacking until 1927, although the dearth of experimental activity with regard to the teaching of mathematics in Grades VIII and IX was certainly an indication of it. If one confines himself to general literature on Soviet education, the chances are good that he would receive the impression that the distinction between the functions of the First and Second Cycles of the Second Level did not exist until official recognition of the same. Such recognition of their functions in the educational process generally, and in the teaching of mathematics in particular, was set down sharply in writing for one of the first times in the discussion on mathematics in the school in Volume I of the *Pedagogical Encyclopedia* /‾Pedagogicheskaia entsiklopediia_/, which was published in 1927:

> *The seven-year school represents an educational institution, which offers a complete elementary education to persons entering directly into working life. The second concentration of the school of the II level* (8th and 9th years of instruction) *pursues a different aim, and namely, preparation for the VUZs and for several professions. Therefore, the teaching of mathematics in the second concentration of the school of the II level, while keeping in sight the application of mathematics to production, should strengthen the logical side of mathematical thought*. Under the propaedeutic knowledge acquired in the seven-year school there is placed a scientific foundation. Educational material on this basis expands, generalizes, and crowns the so-called 'elementary mathematics'

> (algebra, geometry, and trigonometry) and seizes elements of 'higher mathematics' (analytical geometry, beginning of analysis, projective geometry).[160] (Italics mine.)

That the customary practice of the past, wherein a strict discrimination was made between the functions of mathematics programs of the First and Second Cycles, became openly advocated educational policy for the future, is evident from the continuation of the above remarks:

> ...Although we do not have a definite program in mathematics for the 8th and 9th years of instruction up to now, all of the projects on them (those of the GUS, M.O.N.O., and others) agree on the basic problems enumerated above. Equally it is possible to consider it an established fact that in the second concentration of the school of the second level the teaching of mathematics is not able to take part in full measure in the working out of the usual complex topics of a social scientific nature, and should not be connected with the demands of fusionism of sections of mathematics...and of predominant practicalness. On the contrary, the most important feature should be logical, abstract thought, without the sufficient development of which the successful passage of the course of any VUZ is impossible.[161] (Italics mine.)

It would appear from these remarks that, despite the practical orientation of the Second Cycle on vocational biases, the goals of mathematics specifically, and of general educational subjects as a whole, held the theoretical preparation of the pupil to be paramount at this level of training. Also, the evidence that many teachers and schools gave only lip-service to the "complex" suggests that mathematics-science teaching continued as in the past to stress facts and abstract material, not practical applications, at this level.

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[160] A. Voronets, "Matematika v shkole" /"Mathematics in the School"/, Pedagogicheskaia entsiklopediia /Pedagogical Encyclopedia/, ed. A. G. Kalashnikov, I (1927), 805.

[161] Ibid.

## A major exception to the concept of the Unified Labor School: the Rabfak

Whether one refers to the 1923-1931 period as the "experimental period," so common in Soviet literature, or the "romantic period," as suggested by Counts,[162] it does represent a period in which there were concerted efforts to build a uniquely Soviet education system. This system was built primarily on the basis of one type of elementary/secondary institution--the Unified Labor School. While this institution, far and away the most widespread kind in its class,[163] most adequately reflected Soviet educational policy during this period, it would be erroneous to ignore the other types of elementary and secondary educational institutions, which emerged during that period within the era of rapid Russian industrialization and growth.

One of the first breaches in the unified system of Soviet schooling was the three-year Workers' Faculty /‾Rabochii fakul'tet ‾/, known as the Rabfak.[164] As a secondary educational institution, its primary function was to prepare young adults of proletarian origin for work in higher educational institutions.[165] The early educational policy of the Rabfak system of schooling recognized the importance of mathematics as a field of academic endeavor in and of itself.[166] This fact is evident from Tandler's observation that by 1920 three "trends," including that of "physics-mathematics," comprised this system:[167]

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[162] Counts, loc. cit. Counts also includes the years 1921 and 1922 within this designation. However, their inclusion, judging from an analysis of educational policy with regard to the teaching of mathematics, appears to be premature.

[163] Infra, p. 275 (Table 22--The State System of Public Education ....in 1928).

[164] As already indicated, the period of study for the day Rabfak was three years--sometimes four years, whereas that of the evening Rabfak was generally four years.

1) physics-math, which prepared students for the VTUZ and for the mathematics faculty of the university;

2) natural science, which prepared students for careers in the sciences, medicine, and for study in higher agricultural institutes;

3) social economy, which was under the direct control of the gubernia (provincial) committees.

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[165] Of the Rabfak, George Counts says:

> Perhaps no other Soviet educational institution, apart from the Communist Party itself, the Party organizations for children and youth, and the Party schools and universities, expressed so uniquely the spirit and purposes of the Soviet state. The rabfac was a preparatory institution for the universities and higher technical schools organized and administered to serve the new privileged class of workers and peasants. Since the sons and daughters of the bourgeoisie and the 'former people' could not be trusted, since the 'children of the revolution' were deficient in educational and cultural background, and since the Bolsheviks were in a hurry, a special institution to bridge the gap between the old and the new had to be created....Its purpose was to pour a proletarian and Communist contingent into those institutions and eventually into the new Soviet intelligentsia. Counts, op. cit., p. 147.

[166] Counts emphasizes that "practically all of the divisions of the curriculum were supposed to be closely related to the cause of Communism and to develop the Marxist-Leninist world view." (Ibid., p. 149.) Strangely enough, however, besides the "history of the class struggle," mathematics was the only other subject, which was included in all the yearly courses of study of the Rabfak!

[167] Fredrika M. Tandler, "The Workers' Faculty (RABFAK) System in the USSR" (unpublished Ph. D. dissertation, Teachers' College, Columbia University, 1955), p. 167.

However, by 1925-1926, shortly after the assumption of undisputed leadership by the State Scientific Council in matters of educational policy and well into the "experimental period," four different "trends" characterized the program of studies in most of the Rabfaks, namely: the technical, social-economic, biological, and pedagogical trends (enrolling 41.5%, 13.5%, 32.5%, and 12.5% of the students, respectively).[168] Ostensibly, the orientation of pupil preparation in particular groupings ("trends") of related disciplines gave way to technical and vocational specialization. However, the official insistence of the GUS towards the "complex" in the general system of education (i.e., the Unified Labor School) did not directly affect the Rabfaks, since the Glavprofobr (Chief Administration of Professional Education of Narkompros RSFSR)[169] maintained jurisdiction over them. A similarity existed, therefore, between the vocationally "bias"-oriented Second Cycle of the Nine-Year Unified Labor School (Grades VIII and IX) and the majority of the vocationally "trend"-oriented Rabfaks:both types of educational institutions did not capitulate to the "complex," but, for the most part, continued to recognize the individual disciplines as the genuine bases for instruction. Specifically speaking, for example, the replacement of the physics-math "trend" by the technical "trend" in the mid-twenties was not as significant as it would seem. This observation is based on such conditions as the listing of mathematics as an individual category of study in the Rabfak curricula and the relatively significant amount of time allocated to its study for the 1927/1928 academic year, the evidence for which is contained in two sources: Narodnoe prosveshchenie k 1927-1928 [Public Education for 1927-1928] and Programmy dlia Rabochikh Fakul'tetov [Programs for Workers' Faculties]. Whereas the percentages of time allocated to the study of mathematics in the day and evening Rabfaks seem questionably high in the former source,[170] the data of the latter, which are

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[168] Ibid.

[169] Infra,p. 273 (for further identification of the Glavprofobr).

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[170] The data extracted from Narodnoe prosveshchenie k 1927-1928, which are given in Table 20 below, give percentages of time allocated to the study of mathematics in the day and evening Rabfaks of 24.4% and 25.5%, respectively. These figures are even significantly higher than the percentage of time devoted to mathematics for the corresponding First Cycle of the Second Level of the Unified Labor School (Grades V-VII) in 1927 [infra, p.279 (Table 23 containing the Curriculum of the First Cycle of the Second Level of the Unified Labor School, 1927]), when Soviet educational policy reversed itself and endorsed the return to the subject-oriented curriculum in secondary education. Furthermore, the inclusion of the "Graphics" category below with that of "Mathematics," which would be justified on the basis of its stress on technical drawing and the practical application of mathematical principles, would raise these percentages to an extremely dubious 31.1% (day) and 29.0% (evening), respectively.

TABLE 20

CURRICULA OF THE "TECHNICAL TREND" OF THE RABFAK IN 1927/1928 (HOURS PER WEEK)

| | Day Rabfak Hours | | | | Evening Rabfak Hours | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Subject | 1st Yr. | 2nd Yr. | 3rd Yr. | Total | 1st Yr. | 2nd Yr. | 3rd Yr. | 4th Yr. | Total |
| Russian | 8 | 6 | 4 | 18 | 6 | 4 | 4 | 4 | 18 |
| Mathematics | 10 | 9 | 10 | 29 | 6 | 6 | 6 | 8 | 26 |
| Foreign Language | - | 2 | 2 | 4 | - | - | - | - | - |
| Physics | - | 8 | 8 | 16 | - | 5 | 5 | 5 | 15 |
| Class Struggle | 4 | 3 | 4 | 11 | 3 | 3 | 2 | - | 8 |
| Political Economy | - | 2 | 2 | 4 | - | - | 3 | 3 | 6 |
| Economic Geography | - | - | 2 | 2 | - | 2 | 2 | - | 4 |
| Political Literacy | 3 | - | - | 3 | 4 | - | - | - | 4 |
| Biology | 4 | 3 | 3 | 10 | 3 | 3 | 2 | - | 8 |
| Geography | 5 | 2 | 2 | 9 | 3 | - | - | - | 3 |
| Chemistry | - | 3 | 2 | 5 | - | - | - | 4 | 4 |
| Graphics | 4 | 2 | 2 | 8 | - | 1 | 2 | 2 | 5 |
| Total | 38 | 40 | 41 | 119 | 25 | 25 | 26 | 26 | 102 |

Narodnoe prosveshchenie k 1927-1928 [Public Education for 1927-1928] (Moscow: 1925), p. 99, cited by Tandler, op. cit., pp. 190-191.

given for years I-III, are more easily reconciled with the realities at that time.[171]

Based on Tandler's evidence that such curricula for the Rabfak became firmly established by the late-1920's,[172] a case can be made for the importance of both it and that of the Second Cycle of the Second Level of the Unified Labor School as stabilizing influences during a temporary period of experimentation and change. Such stabilization resulted from the policy of both of these types of institutions to teach a basic core of knowledge in each of the fundamental disciplines, as opposed to teaching the "complex," with its conglomeration of assorted facets of knowledge as related to "socially useful work." Their vocational and utilitarian orientation undoubtedly served as a rationale for such a policy of curricular structure. However, insofar as Rabfak policy on teaching methodology was concerned, such policy was often synonymous with the laboratory system. What, then, was the laboratory system, and what characteristics either necessitated or allowed its adaptability to the teaching of the individual disciplines, such as mathematics?

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[171] The data of Programmy dlia Rabochikh Fakul'tetov are more realistic in that, to the study of mathematics for years I, II, and III, there were devoted 5, 4, and 5 hours per week, respectively, as compared to 10, 9, and 10 hours per week for the corresponding grades of the technical Rabfak (day), as given by Narodnoe prosveshchenie k 1927-1928 and cited in Table 20 above.

[172] The curricula of the Rabfak remained essentially unchanged despite the increase in the number of vocational "trends" or areas of specialization from four in 1925/1926 to six by 1930, which included the following: 1) industrial-technical; 2) agricultural; 3) social-economic; 4) medical; 5) pedagogical; 6) arts--music, drama, literature, plastic arts. Malaia sovetskaia entsiklopediia / Small Soviet Encyclopedia /, ed. N. L. Meshcheriakov, VII (1930), 105, cited by Tandler, op. cit., p. 168.

The laboratory system of learning

The laboratory system, which came into vogue at roughly the same time as the "complex system" of teaching in 1923-1924, was said to coincide with the ultimate aim of the Rabfak:

> ---to graduate a student not only having a certain sum of knowledge, which is necessary for the continuation of studies in the VUZ, but also, who is able to work independently and systematically, and who is able to allot his work time according to plan.[173]

Under the laboratory system, studies took place in laboratories (particularly if they pertained to the natural sciences) or in "cabinets" [ "kabinety" ]. Since the study of mathematics took place only in the "cabinets," a more detailed description of the "cabinet of mathematics" offers an immediate insight into the laboratory system as it applied to the teaching of mathematics. A mathematics cabinet was simply a place to study, which, on the basis of its special equipping, was intended for the carrying out of lessons, practical studies, and out-of-class studies in arithmetic, algebra, geometry, and trigonometry.[174] Its equipment included: textbooks [ uchebniki ] for mastering the theory of mathematics and for working out exercises; reference books [ posobiia ] including books with tables of logarithms, trigonometric functions, multiplication, etc.; books for reading outside the compulsory program of study (e.g., books on the history of mathematics, mathematics dictionaries); books for teachers; common mathematics instruments (including compasses, protractors, etc.); devices for geodetic work (including transits, plane-tables, tape measures, etc.); models of geometrical spatial forms and figures; calculating devices (such as arithmometers and sliderules); and drawings (such as graphs illustrating the concept of functional dependence).[175]

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[173] Konstantin I. Bylinskii, Ia. Mendelev, and S. Starodubtsev (eds.), Praktika laboratornykh rabot v shkole [ The Practice of Laboratory Work in the School ] (Moscow: Izd. "Rabotnik Prosveshcheniia," 1926), p. 15.

[174] "Kabinet matematiki" [ "Mathematics Cabinet" ], Pedagogicheskii slovar' [ Pedagogical Dictionary ], Vol. I, 483.

Generally speaking, laboratory studies were of three types:[176] 1) compulsory studies, which took place during regularly scheduled class hours in the presence of a teacher; 2) optional studies of the student in a cabinet at a time in which a teacher-consultant was on duty:[177] 3) individual studying by the student at home or in a Rabfak reading room. Such laboratory studies were conducted collectively by groups, as well as by students working individually. While the concept of individual or independent work, either of the individual or of the group, was the underlying principle of the laboratory system of teaching, the latter stressed (except for the home or reading-room type of study) the role of the teacher as having "large significance for the tenor of the students' individual work, since the teacher of the group, knowing his students, at the necessary moment was better and more easily able to direct the work of the student, who did not completely master the habits of individual work."[178]

The laboratory system of study was an obvious manifestation of the proclivity of Soviet educational policy at this time to draw heavily from foreign educational thought. Just as the "complex" of the mid-twenties traced its origins to Imperial Russian, western European, and American pedagogues,[179] so too the laboratory form of organization of the educational process took on many of the attributes of the Dalton Plan, which, after having been worked out in the early 1920's by Ellen Parkhurst in Dalton, Massachusetts, enjoyed worldwide popularity. Soviet educational literature candidly acknowledged this similarity, such as the report on the experiment of the application of the laboratory system in the "N. I. Bukharin Rabfak" in 1924-1925, which stated: "In the general scheme of organization of studies there were included basic elements of the organization of studies according to the Dalton-plan."[180] As in the Dalton Plan, in the laboratory system of study, subject "laboratories" headed by teacher/consultants, such as the mathematics cabinet, replaced the lesson system of classes in the school.[181]

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[175] Voronets, op. cit., pp. 805-809.

[176] Bylinski, loc. cit.

[177] Since it was assumed that the pupil was unable to cope with the vast amount of material of the program, the cabinets were to be kept open from 4:00-10:00 P.M., at which time a teacher-consultant was to be on duty. Ibid., p. 16.

[178] Ibid., p. 15.

It is fairly easy to comprehend how the laboratory system of study might be employed in the natural sciences, but its use in the study of mathematics is not as apparent. While the type of laboratory study varied somewhat for different subjects, its general purposes were common to all of them. These purposes, together with the manner in which they were implemented in the laboratory study of mathematics, are delineated below:[182]

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[179] Supra, p. 229.

[180] Bylinskii, loc. cit. In numerous English-language sources, and even in a significant number of Soviet sources (e.g., the Pedagogicheskii slovar' [Pedagogical Dictionary]), the Dalton Plan is erroneously considered to be an influence on Soviet education only in the late-twenties and early thirties in conjunction with the project or laboratory-brigade method.

[181] "Dalton-plan" ["Dalton Plan"], Pedagogicheskii slovar' [Pedagogical Dictionary], Vol. I, 298.

| General Purposes of the Laboratory System of Study | Their General Implementation in the Laboratory Study of Mathematics |
|---|---|
| 1) For procuring new material | 1) Through books and/or drawings |
| 2) For the strengthening of skills and habits | 2) Through the learning of theorems by heart, the solution of problems, and the carrying out of calculations |
| 3) For the students' working out of the general principles of education (that is, the development of the powers of observation, the ability to communicate, and the ability to draw conclusions from the whole sum of knowledge independently obtained) | 3) Through individual and group laboratory study, especially in the presence of a teacher |

The *specific means* to achieve the general purposes of the laboratory system, and hence, their manifestation in the study of mathematics, was the "task" ["*zadanie*"]. That is, for each topic studied in the mathematics cabinet or in the laboratory, there were assigned one or more tasks for the pupil or group of pupils, normally together with a stipulated time for their completion. These tasks included such forms of activity as reading assignments in textbooks, review exercises and readings, introductory remarks and helpful study hints, and the solution of problems either in the instructions of the laboratory program itself or referred to in other textbooks. The table below contains a sampling of some of the topics studied by the laboratory system, the number and types of tasks associated with each topic, and the time allowed for the completion of such tasks:

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[182] Bylinski, *op. cit.*, p. 16.

TABLE 21

REPRESENTATIVE MATHEMATICS TOPICS OF THE LABORATORY SYSTEM OF STUDY (N. I. BUKHARIN RABFAK, 1924-1925)[183]

| Topic | Number of Tasks per Topic | Specific Tasks | Task Completion Time |
|---|---|---|---|
| a) "Similar figures" | 5 | 1a) Study of segments of lines between intersected parallels and the similarity of triangles<br>2a) Six-eight problems from the beginning of the chapter "Similar Figures" (of Perelman's New Problem-Book for the Short Course of Geometry), with the mandatory inclusion of a task concerning the plan of the surroundings<br>3a) Study of principal trigonometric functions<br>4a) The systematization of the study of similarity of (simple) figures<br>5a) Application of study concerning the similarity of (simple) figures | Two weeks per task |
| b) "Operations with radicals (without approximated calculations)" | 1 | 1b) Extraction of a root, as an operation which is the reverse of raising to a higher power | Two weeks |
| c) "Graphic solution of a system of first-degree equations with two unknowns | 2 | 1c) Find the graph of a function, which is expressed by some equation<br>2c) Exercises: How many points is it necessary to plot in order to determine the position of a graph of a first-degree equation? etc... | Two weeks and one week, respectively |

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[183] Table 20 compiled from data in ibid., pp. 122-133.

As the description of the laboratory system and the table above might suggest, the laboratory system of study, particularly as it applied to mathematics, was somewhat analogous to present-day methods of programmed learning--lacking principally the fine discrimination techniques and precise sequential organization of the latter.

### The dichotomy of the "complex" and laboratory systems: different means to achieve like ends

In the mid-twenties Soviet educational policy appeared to be bent on reacting to what was considered to be the major defect of the traditional subject-lesson organizational studies: the ignoring of the individuality of the student. Both the "complex" and the laboratory systems were attempts, therefore, to realize the ideal of individualized instruction, whereby studies were to become more meaningful. Both systems advocated the abolition of the subject-lesson. Here, however, the similarities between them ceased. On the one hand, the former stressed the subordination of the individual academic disciplines to the study of a central "complex" and its associated themes in order to prepare the pupil better for life. On the other hand, the laboratory system replaced the subject-lesson with the subject laboratory or subject cabinet, which, with their complete literary and mechanical source materials, were to make each individual subject more meaningfully alive to the pupil--hence, more potentially utilizable for socially useful work in life. In essence, Soviet educational policy, as evidenced by these two principal systems of teaching, came to stress methods relating more to the pupils' own study and activity than to the teachers' formal teaching as the basis of the educational process, such that the major function of the teacher came to be the guidance of the learning process in lieu of that of fount of disseminated knowledge.

As had been encountered by the "complex system" of teaching, the actual traditions and conditions of the day impinged upon the educational theory of the laboratory system of study. Whereas mathematics came to be taught "outside the complex" not long after the introduction of the Programs of the GUS in the mid-twenties for a variety of reasons, so too did the laboratory system of the study of mathematics encounter difficulty in relation to its actual implementation. For example, some of the schools, which had adopted one or another facet of the Dalton Plan, at first made an exception for mathematics by "leaving it inviolable" and allowing a year to pass before experimenting with this "strict science."[184] The main concern in adapting the laboratory system to the study of mathematics appeared to be the combining of sections of mathematics into organic series, which would be able to be grasped by the pupils themselves.[185] Since the study of mathematics contained infinitely many details, each of which was important, one prominent Soviet educator suggested in 1926 that "everywhere, it seems, mathematics is the chief trouble of 90% of the Rabfak pupils."[186] In addition, the lack of necessary funds to equip the cabinets and laboratories properly plagued the laboratory system of study at the outset, since

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[184] N. Plekhanov, "Matematika" /̄"Mathematics"_7, Praktika laboratornykh rabot v shkole / The Practice of Laboratory Works in the School_7, ed. K. I. Bylinskii et al. (Moscow: Izd. "Rabotnik Prosveshcheniia," 1926), p. 116.

[185] Ibid.

[186] Ibid.

> ...one of the fundamental conditions on which the success or failure of carrying out a laboratory plan of studies is the material basis of the laboratory work, the degree of preparedness of the educational institution for placing proper conditions for the new forms of work at the disposal of the students.[187]

While the literature indicates that the Unified Labor School was associated primarily with the "complex system" of teaching, whereas the Rabfak tended to gravitate more toward the laboratory plan of studies, associations that were due in part to the direct subordination of these institutions to different educational administrations (the Glavsotsvos and the Glavprofobr, respectively[188]), a more objective or definitive determination of the nature of these relationships is contingent upon further research and sampling procedures.[189] An example of the difficulty in attempting to generalize the association of the

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[187] *Ia*. Mendelev, "Kabinety i posobiia" ["Cabinets and Training Appliances"] *Praktika laboratornykh rabot v shkole* [The Practice of Laboratory Works in the School], ed. K. I. Bylinskii *et al*. (Moscow: Izd. "Rabotnik Prosveshcheniia," 1926), p. 21.

[188] *Infra*,p.273 (for distinction between the functions of the Glavsotsvos and the Glavprofobr).

[189] This common tendency to minimize the association of different types of educational institutions with the specific educational policies or practices prevailing in them, even though such institutions (i.e., the Unified Labor School and the Rabfak) might be directly responsible to different administrative authorities, resulted from the fact that all educational administrations (i.e., the Glavsotsvos and the Glavprofobr) and the institutions under them came under the jurisdiction, either directly or indirectly, of the same central authority--the People's Commissariat of Education RSFSR. Hence, sweeping generalizations or vague descriptions, such as the following, are fairly prevalent in the literature on Soviet education, including primary source materials: "Teachers were forced to adhere strictly to the directives of the People's Commissariat of Education concerning the brigade, laboratory, and 'complex' (project) methods of instruction...." Vladimir D. Samarin, "The Soviet School, 1936-1942," *Soviet Education*, ed. George L. Kline (New York: Columbia University Press, 1957), p. 26.

Unified Labor School and the Rabfak with a particular type of instructional process is provided by the testimony of a Soviet emigrant, Vladimir Samarin, who graduated from the Nine-Year Unified Labor School in Orel in 1930. Since Samarin entered the Nine-Year School in the fourth grade instead of the first grade, having studied at home for the previous three years, his experiences cover the 1924-1930 period. According to him, textbooks were virtually non-existent, except for the study of social science and mathematics.[190] Even the mathematics books, he contended, were chiefly pre-Revolutionary, due to the scarcity of Soviet ones to replace them.[191] As a result, as opposed to the method of the social science teacher, mathematics was taught via traditional lessons and was the only subject in which grades were recorded.[192]

As if Samarin's recollections, as reported above, did not stand in sufficient contrast to Soviet educational policy at that time, he further claims:

> ...studies were conducted by the laboratory method, the school had 'study rooms' or 'laboratories' instead of classes - a mathematics laboratory, physics laboratory, Russian language laboratory, literature laboratory, etc. The students went from laboratory to laboratory for each new lesson....This applied to grades five through nine.[193]

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[190] Ibid., p. 27.

[191] Ibid.

[192] Samarin described the traditional lesson as including a quiz on the previous day's work, an explanation (of a theorem or concept), the calling of pupils to the board, coverage of the current lesson, and assignment of homework. "That may be why mathematics was the only subject that the students really knew," he added. Ibid.

[193] Ibid., pp. 27-28.

In this instance, therefore, the laboratory method underlay the educational process of the Second Level (Grades V-IX) of the Unified Labor School. But all Unified Labor Schools came under the immediate jurisdiction of the State Scientific Council with its "complex"-based educational programs! A plausible explanation for this dichotomy is that, as already indicated, the Programs of the GUS were never acknowledged to be successful at this level--the Second Level--of the Unified Labor School for various reasons.[194] Samarin's comments do not appear to relate to the First Level, where the influence of the GUS was admittedly the strongest. In addition, the virtual absence of Soviet textbooks alluded to by Samarin had to be compensated for by the utilization of available materials--namely, pre-Revolutionary textbooks, but only in a manner acceptable to the People's Commissariat of Education, that is, the laboratory system of study. Whereas the success of the "complex system" of teaching depended heavily on the delineation of "complex" themes and their accompaniment by methodological notes, the laboratory system represented a more flexible approach, one which was far less removed from traditional methods of instruction. All such explanations notwithstanding, Samarin's observations suggest the complexities involved in attempting to reconcile the realities of educational practice to existing educational policy in a materially wanting, yet rapidly industrializing economy--however centralized the policy-making functions might be!

The several pieces of evidence and the accounts concerning educational policies and practices presented in this chapter reveal certain clear features in an otherwise complex, if not confused, picture. Both

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[194] Supra , pp. 253-255.

Soviet and non-Soviet educational reporting on these problems in the 1920's tend to minimize the diversity as well as the continuity in Russian education after the October 1917 Revolution with its sweeping claims to change. Research indicates, however, that Soviet educational policy attempted to direct not only Soviet culture onto a new historical path in terms of dominant values (scientific-technical knowledge and its applications), but also the practices and preferences of Soviet teachers and scientists linked up with strong reformist tendencies prevalent in the late Imperial period, notwithstanding the insistence of the GUS on radically different curricular and methodological solutions. Those practices and preferences made themselves most felt in the upper grades of the Nine-Year School and in other schools preparing people for higher education.[195] Further continuity with pre-Revolutionary education was noted in the use of many traditional mathematics texts and manuals, especially in lieu of the failure by Narkompros to organize the production of adequate series of school books during the 1920's.

These prominent features of Soviet educational development during the 1920's show that, above and beyond the rather clouded picture created by inconsistencies in national educational policy, a notable continuity of pre-Soviet mathematics education marked the new communist school and its students in the upper levels during most of the decade. The dual social and cultural importance of this educational fact would take on increased meaning as Soviet policy in the 1930's veered toward official restitution of many educational principles and practices honored by the Imperial regime, and as Soviet science made steady progress toward occupying top places in the domain of international science.

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[195] In essence, such practices and preferences represented a continuation of the concern for quality in higher education despite official pedagogical diversions to the contrary at the secondary level. This concern would be stepped up in the early/mid-thirties to include even the quality of preparation of post-graduate candidates at the higher educational level, when the preparation of a core of scientific elite became mandatory if the Soviet Union was to secure a foothold on world science and international scientific-economic competition. *Infra*, pp. 347-348 (for a discussion of the significance of post-graduate or "*aspirantura*" training in the 1930's).

# CHAPTER VI

## RESOLVING THE CONFLICT IN EDUCATIONAL POLICY (1928-1936)

### Administrative and quantitative analysis of Soviet educational policy

The Imperial Russian system of education was characterized by a general education structure, a vocational/technical or professional structure, and to these types of institutions one might add a religious structure of education.[1] These same structures came to exist in the Soviet Union, with the exception that the religious structure of education in Imperial Russia was replaced by a political structure of education in Soviet Russia. Each of these three structures of education was headed by its own chief administration.[2] In turn, all of these administrations were under the jurisdiction of the People's Commissariat of Education (Narkompros) RSFSR, the methodological and curricular functions of which were centralized under its State Scientific Council (GUS). The following diagram depicts the organization of Soviet education during the 1920's on the basis of its principal administrative components:

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[1] *Supra*, p. 1.

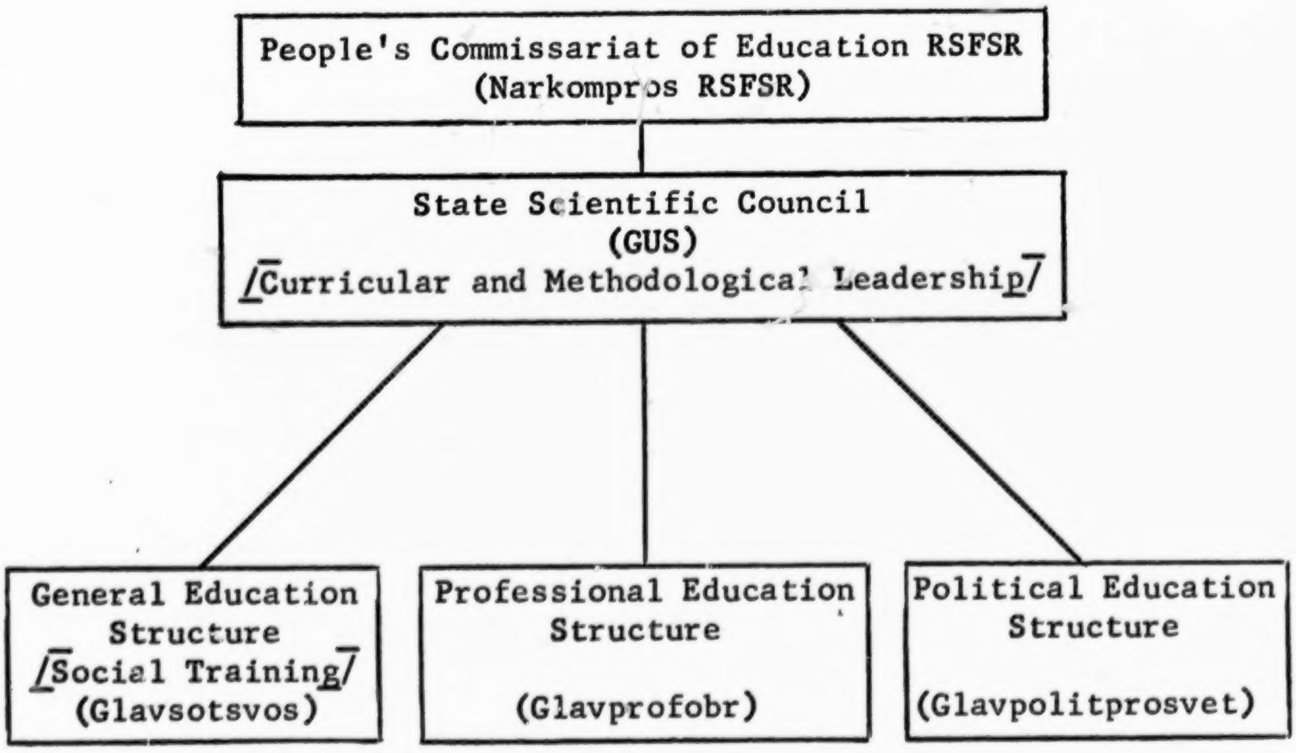
[2] These administrations, including the period of existence of each, its respective structure of education, and the basic function of the structure, were as follows:

1) Chief Administration of Social Training and Polytechnical Education of Narkompros RSFSR/Glavnoe upravlenie sotsial'nogo obrazovaniia Narkomprosa RSFSR--abbreviated hereafter as Glavsotsvos_7--1921-1933. Headed the general education structure, the basic function of which was to provide social training;
2) Chief Administration of Professional Education of Narkompros RSFSR /Glavnoe upravlenie professional'nogo obrazovaniia Narkomprosa RSFSR--abbreviated hereafter as Glavprofobr_7--1921-1928. Headed the professional education structure the basic function of which was to provide vocational/technical training;
3) Chief Political-Education Committee of Narkompros RSFSR /Glavnyi politiko-prosvetitel'nyi komitet Narkomprosa RSFSR--abbreviated hereafter as Glavpolitprosvet_7--1920-1930. Headed the political education structure, the basic function of which was to provide political instruction and literacy.

Data on all three administrations was compiled from the following sources: "Glavsotsvos," "Glavprofobr," and "Glavpolitprosvet," Pedagogicheskii slovar' /Pedagogical Dictionary_7, Vol. I, 265-266; and "Glavsotsvos," "Glavprofobr," and "Glavpolitprosvet," *Slovar' sokrashchenii russkogo iazyka* /Dictionary of Abbreviations of the Russian Language_7 (Moscow: Gosizdat, 1963), 130-133.

DIAGRAM III

Administration of Soviet Education
(1920's)


People's Commissariat of Education RSFSR
(Narkompros RSFSR)
State Scientific Council
(GUS)
[Curricular and Methodological Leadership]
General Education Structure
[Social Training]
(Glavsotsvos)
Professional Education Structure
(Glavprofobr)
Political Education Structure
(Glavpolitprosvet)

Under the jurisdiction of each of these three principal administrations in 1928 were included the following types of educational institutions, together with their numbers and enrollments:

## TABLE 22

## THE STATE SYSTEM OF PUBLIC EDUCATION IN THE U.S.S.R. ACCORDING TO ITS THREE STRUCTURES OF EDUCATION IN 1928[3]

| General Education Structure (GLAVSOTSVOS) | | | Professional Education Structure (GLAVPROFOBR) | | | Political Education Structure (GLAVPOLITPROSVET) | | |
|---|---|---|---|---|---|---|---|---|
| Social Training | Institutions | Students (in thousands) | Vocational/Technical Training | Institutions | Students (in thousands) | Political Instruction | Institutions | Students (in thousands) |
| Schools of I Level | 113,439 | 8,715 | Higher Educ. Institutions (VUZs) | 132 | 169 | Schools of Reading and Writing | 50,666 | 1,644 |
| Seven-Year Schools | 5,707 | 2,071 | Rabfaks | 173 | 57 | Workers' Courses | 513 | 39 |
| Nine-Year and II Level Schools | 1,053 | 964 | Technicums | 1,053 | 208 | Peasants' Courses | 331 | 13 |
| Schools of Peasant Youth (ShKM) | 1,323 | 127 | Professional Schools | 1,372 | 152 | Schools of a higher type | 743 | 83 |
| Schools of Backward Children | 1,239 | 94 | Schools of Factory-Workshop Apprenriceship | 821 | 99 | Other general educational schools | 392 | 30 |
| Nursery Schools and Breeding Grounds | 2,477 | 128 | Long-term Courses | 1,528 | 148 | Soviet Party Schools | 916 | 61 |
| Open-air Kindergartens | 7,030 | 366 | Short-term Courses | 1,332 | 91 | Workers' Universities | 82 | 25 |
| Children's Homes | 1,862 | 162 | Educational Workshops | 314 | 17 | Communist VUZs | 20 | 94 |

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[3] "Narodnoe obrazovanie" ["Public Education"], Malaia sovetskaia entsiklopediia [Small Soviet Encyclopedia], ed. N. L. Meshcheriakov, V (1930), 573.

Despite the proliferation of pedagogical innovation and experimentation carried on under these administrations during the mid-twenties, each heading a particular structure of the Soviet system of education, as evidenced by their variety of educational institutions at the elementary, secondary, and higher levels, this emphasis on radical change in education gradually shifted to that of practical utility and urgency. This shift was motivated almost exclusively by the advent of a program of complete industrialization of the country through the five-year plans. Offhand it appeared that the progressive-experimental, or "romantic," phase of Soviet education ended with the inception of the First Five-Year Plan in 1928. However, the rudiments of this "second aggressive more thoroughgoing phase"[4] in Russian education were evident before this time in several educational policies. The cited attempts to re-edit, to correct, and to supplement the "complex" *Programs of the GUS* and the introduction of local "syllabi-minimum" were overt indications of the disenchantment with State-sponsored programs already by 1926-1927 in the general educational Unified Labor Schools of Glavsotsvos.

Nor was dissatisfaction with the policy and practice of education limited to the network of Unified Labor Schools. Under the jurisdiction of the Glavsotsvos, as far back as 1923 the three-year Schools of Peasant Youth [*shkoly krest'ianskoi molodezhi*--abbreviated hereafter as ShKM] were introduced and spread into the rural areas.[5] The counterparts of these schools in the industrial cities were the Factory-and-Workshop Seven-Year Schools [*fabrichno-zavodskie semiletki*--abbreviated hereafter as FZS], which began to appear in 1925.[6] Through their close association with agricultural and industrial enterprises, respectively, both types of schools stressed the polytechnical instruction of pupils. Their rather early introduction into the general educational structure of education was ominous in that it was tantamount to an official expression of doubt as to the potential effectiveness both of the various experimental programs and of the original Soviet schools, which were responsible for their implementation. Such portent was particularly applicable to the "complex"-oriented Unified Labor School, since the ShKM and the FZS even adopted the latter's concept of "complex" themes as the basis for instruction.

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[4] *Supra*, p. 3.

[5] "Soiuz sovetskikh sotsialisticheskikh respublik" ["Union of Soviet Socialist Republics"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II, 390. These Schools of Peasant Youth remained in operation up through 1934.

The accelerated growth of these two types of schools, with their inordinate stress on the combination of school instruction with practical work, particularly from 1928-1930,[7] was a significant barometer of Soviet educational policy in three respects:

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[6] "Fabrichno-zavodskaia semiletka (FZS)" ["Factory-and-Workshop Seven-Year School (FZS)"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II, 554. The Factory-and-Workshop Seven-Year Schools actually had a three-year course of instruction, since they were built on the basis of the First Level of the Unified Labor School. As the ShKM, they were considered to be general educational institutions (with a significant polytechnical orientation) under the jurisdiction of the Glavsotsvos and remained in operation through 1934. These schools are to be distinguished from the Schools of Factory-Workshop Apprenticeship [*fabrichno-zavodskogo uchenichestva shkoly*--abbreviated hereafter as FZU], which, as three-year professional-polytechnical schools based primarily on the FZS, were under the authority of the Glavprofobr (as opposed to the Glavsotsvos).

[7] This expanded growth of the ShKM and the FZS resulted in their acknowledgment by 1931 as the principal types of general educational schools (under the Glavsotsvos) in the agricultural and industrial centers, respectively. *Ibid*.

1) It indicated that the effect of the First Five-Year Plan on Soviet educational policy was very pronounced--to the extent that Marx's original concept of polytechnical education, which had enjoyed short-lived prestige immediately after the October Revolution, was once again held in high regard;

2) It indicated that the teaching of subjects "outside the complex," such as mathematics, had taken its toll; that is, it suggested that graduates of the Unified Labor School were really not prepared for life, since they were not equipped to assume definite positions in the economy of the country;

3) It was an indication of the victory of local initiative, through the publication of various syllabi-minimum in 1926-1927, to restore the integrity of the individual subjects in the education process; it was also an indication that one of the original roles of the Unified Labor School, practical training, seemed to be in the process of being rapidly reassigned to the ShKM and the FZS; hence, it foretold of a rapidly changing function of the Unified Labor School.

## Advent of the transformation of the Unified Labor School

The new 1926/1927 Programs and Notes on Methods for the Unified Nine-Year Labor School, while not containing any fundamental revision of the 1923-1924 GUS programs for the First Level, did abolish the trinity of "Labor," "Nature," and "Society"--hence, the "complex system" of teaching--in the Second Level.[8] Thus, in 1927 the newly prescribed curriculum for the First Cycle of the Second Level of the Unified Labor School restored the separate subjects in accordance with the following scheme:

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[8] Sergius Hessen and Nicholas A. Hans, Educational Policy in Soviet Russia (London: P. S. Kind & Son, Ltd., 1930), p. 109. Since the "Complex" never achieved any success or stability in Grades VIII and IX of the Unified Labor School, by "Second Level" here is implied the First Cycle (Grades V-VII) of the Second Level.

TABLE 23

CURRICULUM OF THE FIRST CYCLE OF THE SECOND LEVEL OF THE UNIFIED LABOR SCHOOL (1927)[9]
(HOURS PER WEEK)

| | Grades (hrs. per week) | | | Total | | Total # hours First Cycle* |
|---|---|---|---|---|---|---|
| Subject | V | VI | VII | Hrs. | % | |
| Mathematics | 4 | 4 | 5 | 13 | 12.1 | 442 |
| Physics | 4 | 4 | 4 | 12 | 11.2 | 408 |
| Chemistry | 1 | 2 | 2 | 5 | 4.7 | 170 |
| Natural Science | 3 | 4 | 4 | 11 | 10.3 | 374 |
| Geography | 2 | 2 | 2 | 6 | 5.6 | 204 |
| Russian Language & Literature | 5 | 5 | 4 | 14 | 13.1 | 476 |
| Political Literacy | 4 | 4 | 4 | 12 | 11.2 | 408 |
| Foreign Languages | 3 | 3 | 3 | 9 | 8.4 | 306 |
| Drawing & Painting (fine art) | 2 | 2 | 2 | 6 | 5.6 | 204 |
| Manual Work | 3 | 3 | 3 | 9 | 8.4 | 306 |
| Gymnastics (Phys. Cult.) | 2 | 1½ | 1½ | 5 | 4.7 | 170 |
| Singing & Music | 2 | 1½ | 1½ | 5 | 4.7 | 170 |
| Total | 35 | 36 | 36 | 107 | 100% | 3638 |

*Calculated on the basis of 34 academic weeks per year.

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[9] Ibid. The data of the right-hand column, "Total # hours First Cycle," compiled from F. F. Korolev, T. D. Korneichik, and Z. I. Ravkin, Ocherki po istorii sovetskoi shkoly i pedagogiki 1921-1931 /Essays on the History of the Soviet School and Pedagogy 1921-1931_7 (Moscow: Izd. Akademii Pedagogicheskikh Nauk RSFSR, 1961), p. 79. The data of Korolev et al. on the weekly number of hours by subject and grade in the Seven-Year School (1927) exactly corroborates that of Hessen and Hans (cf. p. 79 of Korolev, et al).

The adoption of the curriculum above testifies to the fact that the initiative of local sections of public education, with their introduction of syllabi-minimum, and simultaneously, their increased reluctance to teach mathematics in relation to the "complex,"[10] had forced change upon the educational policy of the State Scientific Council. Moreover, many sections were not contented to accept without reservation this new curriculum of the GUS, even though it represented a bold concession to them. For instance, whereas it allocated four hours a week for the study of mathematics in Grades V and VI, the schools of the Cheliabinsk, Zlatoustovsk, and Sverdlovsk districts apportioned five hours a week to it.[11]

While the allocation of hours to the study of mathematics, including such deviations from it, was not appreciable, the importance of this new curriculum lay in its discontinuation of the emphasis on the socio-political indoctrination of pupils and a return to functions primarily academic. The only category in the curriculum, which was a carryover from the "complex" programs, was "political literacy." "Political literacy," sometimes called "knowledge of society," replaced history and religion among the traditional pre-Revolutionary subjects.[12] The study of ancient languages was the only traditional subject, which was totally excluded without a replacement. This 1927 curriculum was the advent, the first phase, of the return of the entire Unified Labor School to traditional educational programs and methods. The sequence of this transformation is noteworthy in that it started at the upper secondary grades and proceeded downward: the Second Cycle of the Second Level (Grades VIII and IX) never really discontinued the individual academic subjects as the basis for the educational process, whereas the First Cycle of the Second Level (Grades V-VII) abandoned them from approximately 1923-1926, and the First Level (Grades I-IV) retained the "complex" until State legislation signaled the complete transformation of the general education system of schooling to traditional programs and techniques in the early 1930's.

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[10] Supra, pp. 243-6 (for the discussion of these local perversions of the Programs of the GUS in 1925-1926).

[11] Arkhiv Minprosa RSFSR, f. Glavsotsvosa [Archives of the Ministry of Education, entry of Glavsotsvos], op. 6, sv. 4, ed. khr. 31, 1, 15, cited by Korolev et al., op. cit., p. 176.

[12] Supra, p. 42 (Table 5--Secondary School Curricula Under the Ignatiev Plan [1916] ).

The soaring growth of higher educational institutions and their enrollments for the 1928-1933 period[13] helps to explain why this transformation proceeded from the highest levels of the Unified Labor School in a downward direction. Increased enrollments into higher educational institutions, which were the source of qualified scientific cadres to meet the demands raised by the First Five-Year Plan, called for a proportionate increase in the number of qualified applicants. Such a condition could only be brought about by a commensurate increase in the number of applicants entering them from secondary educational institutions--the Nine-Year Unified Labor School, the Rabfak, and the Technicum. Only deliberate changes in Soviet educational policy could effect the numerical expansion of this prospective group of scientific workers and intelligentsia. As the enrollment figures for 1928 suggest,[14] since the Rabfak enrollments were practically negligible as compared to those of the two principal types of VUZ-preparatory institutions,[15] the Unified Labor Schools and the Technicums, the bulk of the increase in the necessary number of VUZ-candidates would have to come from the latter.

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[13] _Infra_, p.282 (for a comparison of enrollments in higher educational institutions in 1928 and 1933).

Two alternatives were open to educational policy-makers in taking specific measures to realize this increased enrollment of the higher institutions of learning: the lowering either of the entrance requirements of the VUZs, or of the grade level at which genuine scientific preparation in the individual academic subjects would commence--thereby giving official sanction to the partial dissolution of the "complex" in the First Cycle of the Second Level of the Unified Labor School.[16]

We cannot deny that, if at the beginning of the First Five-Year Plan in 1928, the VUZ enrollments approximated 177,000 students, which jumped to 504,000 students by the beginning of the Second Five-Year Plan in 1933,[17] the first alternative received more than token consideration! After all, as indicated in Chapter II, the 1928-1936 period really ushered in the "second aggressive more thoroughgoing phase," within the early years of which, particularly those of 1928-1930, quantitative considerations were said to have impinged heavily on the preparation of scientific cadres.[18] However, serving to temper any gross conclusions in this respect was the fact that entrance examinations were established for the first time in the higher educational institutions in 1926.[19] These examinations were introduced with the aim of selecting students who were genuinely academically prepared, despite the observance of certain enrollment quotas on the basis of class origin.

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[14] Supra, p.275 (Table 22 --The State System of Public Education in the U.S.S.R. According to Its Three Structures of Education in 1928).

[15] If earlier speculation as to the proneness of the Rabfaks to employ the laboratory system of teaching, with its greater emphasis on the individual disciplines than that of the "complex," is genuinely true, this circumstance might serve as justification for little apparent need for a change in their status qualitatively, as well as quantitatively.

[16] Since pupils of the Technicum received their academic preparation in the Seven-Year Unified Labor School, a change in the status of the "complex" stood to affect it, as well as the Unified Labor School itself.

[17] Sergei I. Vavilov, Tridtsat' let sovetskoi nauki /‾Thirty Years of Soviet Science_/ (Moscow: Izd-vo Akademii nauk SSSR, 1947), p. 41.

More significant, at least for the purposes of this study, was the activity centering around the second alternative, which stressed the strengthening of the scientific preparation of VUZ-candidates. The reintroduction of the subject-centered curriculum into the First Cycle of the Second Level of the Unified Labor School in 1927[20] was the prime manifestation of such activity. The effect of this change should not be underestimated. Both the Technicum, based as it was on the Seven-Year Unified Labor School, and the Nine-Year Unified Labor School stood to be greatly influenced by it. As suggested by their relatively high enrollment figures,[21] and confirmed by other statistical evidence,[22] it was precisely these two educational institutions that provided the overwhelming majority of the contingent of students entering into the higher educational institutions.

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[18] Supra, pp. 119 and 125.

[19] A. Abinder, "Akademicheskaia uspevaemost' studentov" /"Academic Progress of Students"/, Nauchnyi rabotnik / Scientific Worker/, No. 3 (March, 1927), 49.

[20] Supra, p. 279

[21] Supra, p. 275 (Table 22 --The State System of Public Education in the U.S.S.R. According to Its Three Structures of Education in 1928).

Formerly, the more able and prepared students had naturally gravitated toward the final cycle (Grades VIII and IX) of the Nine-Year Unified Labor School, whereupon they undertook the study of the individual disciplines at a depth able to prepare them for studies in higher educational institutions, especially in the universities. Such "educational determinism" closely paralleled the economic determinism, which, up until the First Five-Year Plan, had generally characterized economic development in the Soviet Union.[23] However, just as the First

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[22] According to A. I. Abinder, data from the Glavprofobr on the secondary preparation of students who passed through the testing commissions and entered into VUZs in 1927, while somewhat incomplete and sketchy, indicated that the principal contingent of them had graduated from the Nine-Year Unified Labor School. In the absence of fixed percentages as to the proportion of the total VUZ enrollment, which graduates of each type of secondary educational institution constituted, the following examples tend to corroborate Abinder's opinion:

VUZ ENROLLMENT % BY TYPE OF SECONDARY PREPARATION (1927)

| VUZ | Nine-Year Unified Labor Sch. | Technicum | Rabfak |
|---|---|---|---|
| I MGU (First Moscow State University) | 80% | - | - |
| II MGU (Second Moscow State University) | 75% | 25% | - |
| Moscow Textile Institute | 75% | - | - |
| Institute of the National Economy (Leningrad) | 77% | - | - |
| Moscow Mechanical Institute (named Lomonosov) | 61% | - | - |

A. I. Abinder, "Itogi vstupitel'nykh ispytanii v vysshie uchebnye zavedeniia RSFSR v1927 v." ["Results of Entrance Examinations in Higher Educational Institutions of the RSFSR in 1927"], *Nauchnyi rabotnik* [Scientific Worker], No. 10 (October, 1927), 51.

[23] Cf. p. 120.

Five-Year Plan reflected a teleological approach to the economic industrialization of the country, so too are direct parallels to be found in Soviet education at this time, which pointed to the emergence of a genuinely teleological approach to educational policy.[24] Highly centralized planning became the sine qua non of Soviet education as well as of the Soviet economy.[25] The objectives of such planning were initially short-range in nature, particularly during the 1928-1930 period, when quantitative considerations in the education of students--the future scientific cadres--were paramount. From approximately 1931 onward, whence the emphasis of educational policy began to shift steadily toward long-range objectives, qualitative considerations began to dominate the preparation of students.[26] The vehicle reinforcing this new teleological emphasis in education, with its shift toward emphasis on the product of the educational process (quantity ——→ quality), was the sequence of legislation, which was introduced and propagated as Soviet educational policy during roughly the second decade of this "second aggressive more thoroughgoing phase"of Russian modernization.

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[24] The term "genuinely" is emphasized here, because the high degree of centralization inherent in Soviet education since its inception, if only primarily in the de jure sense up to this time (that is, up to this time there appeared to exist a high degree of disparity between the theory and practice of centralization in Soviet education), rendered educational policy, in theory at least, teleological in its conception from the outset.

[25] S. I. Vavilov aptly lumps economic industrialization and education together under "science," and concludes" "The decisive transition to a planned system constitutes a most characteristic feature of Soviet science in the second period of its history, which coincides approximately with the Soviet second ten years." Vavilov, op. cit., p. 40.

[26] An exception to this appraisal as to when educational planning became long-range in nature is suggested by Hessen and Hans in their analysis of the reasons underlying the "jump forward" in educational policy in the Soviet Union in 1929. Cf. Hessen and Hans, op. cit., pp. 226-227 (in Chapt. XVI, "Conclusion. The Five-Years Cultural Plan").

This sequence of legislation was the culminating phase--the "legitimization phase"--in the actual transformation of the Unified Labor School. The following compendium of major Soviet legislation on education, in capsulizing Soviet educational policy during the 1928-1937 period, shows that in the transformation of the Unified Labor School specifically, and of Soviet education generally, no aspect of education remained untouched:

## TABLE 24

## COMPENDIUM OF PRINCIPAL LEGISLATION ON SOVIET EDUCATION, 1928-1937

| (1) Date | (2) Decree (or recommendation) | (3) Originating Agency(ies) | (4) Orientation: Quan. (Qn) versus Qual. (Ql) Qn Ql | (5) Educ. Level Directed at E S H | (6) Nature of Legislation | (7) Source (pp.) |
|---|---|---|---|---|---|---|
| 11 April 1928 | "On the mining affair & practical problems... of economic construction" | TsK VKP(b) | Qn | H | "The facts examined in connection with the mining affair with exceptional sharpness emphasize the necessity of improving the matter of utilization of specialists of science and engineering in our industry, transportation, etc.. ..It is necessary to concentrate special attention on the problem of preparation of new cadres of red specialists and on *the significant expansion of their utilization in production.*" (Italics mine.) | a (p. 8) |
| 12 July 1928 | "On the improvement of the preparation of new specialists" | TsK VKP(b) | Qn | S H | Places the preparation of scientific cadres as the central problem of socialist construction.<br>*General comments*: "Thus, there is present a sharp disparity between the demands for qualified specialists for technically reformed industry and for fully developed capital construction, on the one hand, and the status of the matter of preparation of new cadres of specialists by existing higher technical institutions and technicums, on the other hand. The task of eliminating this contradiction demands a | b (pp. 56-57) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| | | | | | decisive change in the rate and methods of the whole preparation of new cadres of specialists and, in accordance with this, the establishment of an organic connection with production by higher educational institutions and technicums, along with ensuring a significant reinforcement of their material base....The radical improvement of the matter of preparation of new cadres of specialists is not only the most urgent task of the organs of the People's Commissariat of Education, the economic institutions, etc....The preparation of new specialists is the most important task of the whole Party." | |
| | | | | | Specific measures for the preparation of new specialists:<br>1) "...double the proportion of the engineering-technical composition in large-scale industry by the end of the /First/ Five-Year Plan...<br>2) Begin in 1928 the organization of several VTUZs of the new type, especially for the critical specialties....<br>3) Expand the number and network of technicums so that by the end of five years the ratio between the number of engineers and technicians (graduates of technicums) is not less than 2:3.<br>4) Carry out...the systematic increase of the percentage of scientifically prepared technical forces amongst those occupying engineering posts.... | (pp. 5-7)<br>c |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| | | | (Q1)* | | 5) Proceed from the 1928/1929 academic year toward the unification of the systems of technical education in the USSR."<br>Specific changes for the organization of the educational network:<br>"With the aim of the quickest preparation of new specialists with accumulated experience...to transfer six VTUZs and five technicums to the authority of the VSNKh [Higher Council of the National Economy] and two VTUZs to the authority of the NKPS [People's Commissariat of Ways of Communication]....To support the development of such VTUZs and technicums of a new type, which are able to prepare in a shorter period of time engineers and technicians with a more sharply expressed specialization and with significant production practice."<br>*While primarily stressing the quantity of specialists prepared, the resolution does pay lip-service to the quality of the specialists' preparation:<br>"While strengthening the role of production training in every possible way in the general preparation of specialists, simultaneously [it is necessary] to ensure the further raising of the level of their scientific-theoretical preparation." | |
| Nov. 1928 | Recommendation of TsK VKP(b) | TsK VKP(b) | Q1 | H | "The present period sharply raises in connection with new demands the question not only concerning the quantity, | d (p. 20) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| | | | | | but also concerning the quality of specialists....The development of industry and agriculture on the basis of the latest achievements of world science and engineering[etc.]...demand a new type of technical leaders...and cadres of these specialists of a new type should possess sufficiently deep knowledge, especially technical and economic...." | |
| Early 1929 | "On the introduction of a ten-year period of study" | SNK RSFSR | Q1 | S | Has as its aim the improvement of the quality of preparation of pupils of the Second Level of the Unified Labor School. Results from the demands of the July Plenum of the Central Committee VKP(b) in 1928 to raise the academic accomplishments and progress of graduates of the Second Level School. Permits abolishing the overloading of school programs and, connected with this, the learning of a smattering of knowledge by the pupils. | n (p. 97) |
| Nov. 1929 | Decrees of the Plenum of the TsK VKP(b) | TsK VKP(b) | Qn | S H | Radically reorganizes the whole system of industrial-technical educ. according to the "trade principle" in order to strengthen its immediate connection with industry. That is, it reorganizes all professional-technical education by the various branches of industry. Industrial technicums receive directions for the preparation of specialists of secondary qualifications having a strongly pronounced | e (p. 779)<br>o (p. 18) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| | | | | | specialization, in accordance with which their educational plans are to be shortened to three years (instead of four years) of study, production practice is to comprise 50% of study, and specialization is to be started with the first year of instruction | |
| | | | | | Numerous higher educational institutions of Narkompros transferred to the jurisdiction of other people's commissariats dealing with a particular trade or other aspect of the national economy. | f (pp. 7-11) |
| | | | | | Transforms into independent VUZs or VTUZs (or institutes) several departments of university faculties, such as the chemistry and geology departments of the physico-mathematics faculties, and whole faculties (including the faculties of medicine, law, history-philology, and pedagogy), and reassigns them to corresponding economic people's commissariats from that of Narkompros. | i (pp. 4-5)<br>g (p. 13)<br>h (p. 27) |
| 25 July 1930 | "On the immediate tasks of cultural construction in connection with the results of the II All-Union Party Conference on Public Education" | TsK VKP(b) /II All-Union Party Conference on Public Education_/ | Qn | S | The technicums, all of which are constructed on a basis, while being specialized schools, and at the same time representing a phase of general polytechnical education at the upper secondary level of education, at this time to replace the Second Cycles of the Second Levels of the Unified Labor School--that is, the latter are to be reorganized into technicums (this reorganization to be completed by the end of the First Five-Year Plan).<br>Emphasizes the preparation of specialists of secondary qualifications with a strongly pronounced specialization. | e (p. 779)<br>n (p. 491) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| 14 Aug. 1930 | "On the introduction everywhere of universal compulsory elementary education" | TsIK USSR and SNK USSR | Q1 | E | Introduces everywhere universal compulsory elementary education beginning with the 1930/1931 academic year. Includes children eight-ten years of age (Grade IV). | j (p. 393) |
| 5 Sept. 1931 | "On the elementary and secondary school" | TsK VKP(b) | Q1 | E S | Abolishes the Unified Labor School and switches over to a polytechnical school combining instruction with production work in a school network comprised of primary (Grades I-III), incomplete secondary (Grades IV-VII), and complete secondary (Grades IV-X) schools. Sharply turns attention of the whole Party to the question of quality of school work: "The Soviet school is still far from satisfying those enormous requirements made of it by the contemporary stage of socialist construction. The Central Committee considers that the fundamental defect of the school at the given moment consists in the fact that instruction in the school does not give a sufficient volume of general-educational knowledge and unsatisfactorily solves the task of preparation for the technicums and the higher school of completely literate people who possess well the bases of the sciences (physics, chemistry, mathematics, native language, geography, and others)." Especially notes the unfavorable conditions surrounding the teaching of mathematics. | k (p. 80) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
|  |  |  |  |  | Counters any anti-Leninist endeavors to subordinate educational studies in the school to second or third place, while raising the role of the teacher and emphasizing such aspects of education as: the discipline of students, the creation of firm educational programs and fixed schedules. These solid educational programs must stress polytechnical training. However, *in contrast to previous educational policy*, *it emphasizes the importance of the study of individual subjects, particularly mathematics and the sciences*: *"Any attempt to separate polytechnization of the schools from the systematic and thorough assimilation of the sciences, particularly physics, chemistry and mathematics, the teaching of which must be based upon strictly defined and carefully developed programs and curriculums and conducted in accordance with rigorously established schedules, comprises the grossest distortion of the polytechnical school*." /Italics mine._/ | 1 (p. 4) |
|  |  |  |  |  | Calls for the reconstruction of scientific-research pedagogical institutes, which must overcome their significant isolation "from the practical tasks of the mass school and from the most important requirements of pedagogical cadres." |  |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| 25 Aug. 1932 | "On educational programs and policy in the elementary and secondary school" | TsK VKP(b) | Q1 | E S | This decree is a sequel to the 5 Sept. 1931 decree. "There is still not eliminated up to the end the fundamental defect of the school, which consists in the fact that instruction in the school does not give a sufficient volume of general-educational knowledge and unsatisfactorily solves the task of preparation for the technicums and the higher school of completely literate people, who possess well the fundamentals of the sciences (physics, chemistry, mathematics, native language, geography, and others)."<br>Cites as the most important reasons preventing the school from eliminating this fundamental defect: "Defects of the programs (in particular for... grades V-VII), the unsatisfactoriness of methods of school work, the weakness of methodological guidance by people's commissariats of education and their local organs, weak discipline in the school, and sometimes the absence of any kind of discipline and order." Notes, in addition, such specific defects in elementary and secondary programs as the overloading of them with educational material, insufficiency or absolute absence of coordination between separate programs, mistakes in principle in a number of the programs, etc. Calls for the reorganization of the Seven-year School into the Ten-Year School. | k (p. 81-82)<br>m (pp. 39-40) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
|  |  |  |  |  | Concerning teaching methodology, it notes that, despite the instruction in the decree of 5 Sept. 1931 that 'not a single method is able to be acknowledged as the principal and universal method of educational instruction,' "in the practice of the work of schools the so-called 'laboratory-brigade method' received principal dissemination (in a number of schools it became universal), which [method] was accompanied by the organization of permanent and compulsory brigades, which resulted in perversions in the form of absence of personal responsibility in educational work, in the lowering of the role of the pedagogue and the ignoring of the individual educational instruction of each student in many cases."<br>Orders the people's commissariats of education of the union republics to eliminate these perversions of the laboratory-brigade method ("...hence, eliminates the laboratory-brigade and other methodological hare-brained schemes of teaching.").<br>Concerning teacher training, it criticizes the pedagogical technicums and pedagogical institutes, and stresses placing the whole matter of pedagogical education into suitable form. |  |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| 19 Sept. 1932 | "On the programs and policy in the higher school and technicums" | TsIK USSR | Q1 | S H | As the higher education sequel to the 5 Sept. 1931 and 25 Aug. 1932 decrees on the elementary and secondary schools, represents a turning point in the history of the higher school. In the technicums and higher educational institutions there exists "one-sided attention to quantitative growth... in the presence of inadequate attention to matters of the quality of academic preparation." Proposes "strengthening existing universities, as educational institutions preparing highly qualified specialists and pedagogues in the general scientific disciplines, and developing universities in all republics where none of them exist." Puts an end to the organizational confusion and "harebrained schemes" of the universities and serves as the basis for their reorganization upon new regulations of Narkompros.<br>Especially singles out post-graduate training [*aspirantura*]: "The recruiting of post-graduates in the future will be carried out only from those having successfully completed higher educational institutions." However, it does not repudiate the class principle in the recruitment of post-graduates. Stipulates that it is necessary to combine both principles: class and academic. | ff (p. 279)<br>o (pp. 18, 96)<br>p (p. 121)<br>q (p. 106) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
|  |  |  |  |  | Regarding the nature of the educational process: draws analogy between the secondary and higher schools insofar as the unsatisfactory quality of preparation of their students is concerned. The growth of national economic tasks demands "all the more higher qualification, the mastering of the scientific bases of contemporary techniques with deep knowledge." Therefore, the principal task of higher schools (as well as technicums) is to raise the whole quality of studies by raising theoretical education and strengthening the connection with production. Repudiates the "brigade-laboratory method," which lowers the students' responsibility for their own work, introduces firm educational plans, recommends employing the lecture as a "method of teaching, which promotes the rapprochement of the professor with the students in that after the lecture a well-grounded study of the material under the leadership of assistants and under the obligatory control of the professor would follow," bans collective tests, and introduces spring and winter examination sessions, graduation theses, and compulsory entrance examinations for all applicants to VUZs and technicums. Prescribes "revising by 1 Jan. 1933 the educational plans and programs so that to all the general-scientific (mathematics, physics, | r (p. 67) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| | | | | | chemistry, theoretical mechanics), general-technical, and special subjects in the VUZs and VTUZs there would be allotted no less than 80-85% of the time, and in the technicums--no less than 70% of the time without production practice."<br>Abolishes the State Scientific Council (GUS) and transfers its functions to the Educational-Methodological Sector of the People's Commissariat of Education RSFSR. | |
| 12 Feb. 1933 | "On textbooks for the elementary and secondary school" | TsK VKP(b) | Q1 | E S | With regard to textbooks, condemns previous practices as "incorrect" and "intolerable." Demands "real textbooks," as opposed to those which "do not impart systematic knowledge of the subjects of the curricula." Instructs Narkompros tc prepare "stable textbooks" on the "native language, mathematics, geography, physics, chemistry, biology, etc." Sets date of their publication as "July 15, 1933, in order that they may be ready for the opening of the academic year - September 1, 1933." | v (p. 71)<br>w (p. 72) |
| 19 Oct. 1933 | "On agricultural aspirantura" | TsK VKP(b) | Q1 | H | Brings about the fundamental directions for implementing that portion of the 19 Sept. 1932 decree of the TsIK USSR concerning postgraduate students and training. | r (p. 84) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| 13 Jan. 1934 | "On academic degrees and titles" | SNK USSR | Q1 | H | Brings complete clarity and organization into the matter of the post-graduate training of scientific cadres. "Release from the sending to work in production before enrolling into aspirantura is able to be permitted only to persons, who are most prominent in their aptitudes for scientific work or who are specializing in general-scientific disciplines (mathematics, physics, theoretical mechanics, and so forth), in each individual case with the permission of the appropriate people's commissariat." Allows for preparation of such cadres only in higher educational institutions and scientific research institutions staffed with the most highly qualified scientific cadres and equipped the best. | r (p. 84)<br>s (p. 58) |
|  |  |  |  |  | Concerning academic degrees and titles (recall that the decree of SNK USSR of 1 Oct. 1918 did away with academic titles and degrees "pending the publication of a new statute on Russian universities"): places emphasis on the interconnection between the academic title and the academic degree. "With a view to encouraging scientific work and raising the qualifications of scientific and scientific-pedagogical cadres, the SNK USSR decrees: | t (p. 48) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
|  |  |  |  |  | 1) To establish the following academic degrees: a) candidate of sciences; b) doctor.<br>2) To establish the following academic titles:<br>a) assistant (in higher educational institutions) or junior research worker (in scientific-research institutions);<br>b) dotsent (in higher educational institutions) or senior research worker (in scientific-research institutions);<br>c) professor (in higher educational institutions) or active member of a scientific-research institution.<br>3) Academic degrees define the qualification of a given person in the area of a definite scientific discipline according to volume of knowledge, degree of independence of his scientific work and its scientific significance.<br>4) Academic titles define the official scientific function (pedagogical or scientific-research).<br>5) For receiving the degree of candidate of sciences in one or another scientific discipline there is required the successful passage of aspirantura during a fixed time (or the passing of an appropriate examination) and a public defense by the candidate of a dissertation on a subject selected by the competitor. The dissertation is supposed |  |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| | | | | | to reveal general theoretical knowledge in the area of a given discipline, special knowledge on problems of the dissertation, and aptitude for independent scientific research.<br>6) For receiving the academic degree of doctor it is necessary:<br>a) to have the academic degree of candidate, etc....<br>Comment 1.<br>Persons similarly are to be allowed a public defense of a doctoral dissertation who do not have an academic degree of candidate, but who are well-known by their scientific works, discoveries, or inventions.<br>Comment 2.<br>The degree of doctor is able to be conferred without the defense of a dissertation by persons, who are well-known for outstanding scientific works, discoveries, or inventions." | |
| 16 May 1934 | ——— | TsK VKP(b)<br>SNK USSR | Q1 | E S | Establishes a single system of school education based on three types of general educational schools: 1) Elementary school (four years); 2) Incomplete secondary school (seven years); 3) Secondary (complete) school (ten years). | dd (p. 21)<br>ee (p. 284) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| 3 Sept. 1935 | "On the organization of educational work and inner order in the primary incomplete secondary and secondary school" | TsK VKP(b) | Q1 | E S | Sequel to the 12 Feb. 1933 decree of the TsK VKP(b) on textbooks to facilitate and to guarantee the mastery of knowledge. Develops "final and transfer examinations," promotions, diplomas, and academic awards. Restores system of grading used in Imperial Russian education (i.e., the five-point grading scale: (1)-very bad, (2)-bad, (3)-satisfactory, (4)-good, and (5)-excellent). Delineates criteria for promotion from one grade to another and for enrollment into higher educational institutions (stipulates that a grade of "5" in the subjects of one's major field and a "4" in the remainder allows the secondary school graduate admission into a higher educational institution without an entrance examination). | v (p. 72)<br>w (p. 72) |
| 23 Nov. 1935 | "New regulations of the Academy of Sciences USSR" | SNK USSR | Q1 | H | Sequel to the SNK USSR decree of 25 April 1934, whereby the Academy of Sciences USSR was transferred from Leningrad to Moscow. Emphasizes for the first time the necessity for the Academy to conduct research not only in the area of theoretical knowledge, but also in the area of applied science, in defining its principal task as "giving every possible assistance to the general raising of the theoretical, and also the applied sciences in the USSR...." Joins the work of the Academy, as the highest scientific institution in the USSR, to the immediate needs of socialist construction of the USSR. | x (pp. 7-8)<br>y (p. 43) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| 21 May 1936 | "On the education of the All-Union Committee on the Higher School" | TsIK USSR<br>SNK USSR | Q1 | H | Abolishes the All-Union Committee on Higher Technical Education and forms under the SNK USSR the All-Union Committee on the Higher School, which is responsible for "the establishment of the number and types of higher educational institutions, the approval of types of educational plans and programs, ...the enrollment of students, the examination of the plan of distribution of graduates from the higher school between departments of the Union SSR and the union republics, the approval of directors of VUZs, and the approval of teachers of VUZs having the ranks of professor and docent." | b (p. 90) |
| 23 June 1936 | "On the work of higher educational institutions and the leadership of the higher school" | SNK USSR<br>TsK VKP(b) | Q1 | H | Upgrades the preparation of scientific cadres and the importance of scientific research in higher educational institutions. Holds that "the status of preparation of cadres in the higher school still remains unsatisfactory.... the level of studies in a number of higher educational institutions is not much more distinguished from the standard of the middle school (technicums). Educational plans are still multi-subject in nature and are subject...to annual changes. Stable textbooks for the higher school are absent and there are absolutely no textbooks in a number of the most important disciplines....group work with unqualified leaders takes the place of | b (pp. 91-101)<br>p (pp. 142-143)<br>z (pp. 68-72) |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
|  |  |  |  |  | established lectures, and at the same time students are overloaded with other forms of educational work to the detriment of their independent work. In spite of the resolution of the TsIK USSR of 19 Sept. 1932 concerning the fact that production practice should be an organized part of the whole educational process - there is still no proper leadership of this important aspect of instruction."<br>Hence, there "results the necessity of the revision of antiquated programs, textbooks, reference books,...." In addition, "all who enter into higher educational institutions are subject to entrance examinations in the following subjects: a) Russian language, b) grammar, c) literature..., d) political knowledge, e) mathematics, f) physics, g) chemistry, and from 1937 on, one of the foreign languages (English, German, French)."<br>Concerning the organization of the educational process: "it is still necessary, despite its categorical prohibition, to abolish group study for the study of lecture material, which represents the survival in our own time of the censored so-called brigade-laboratory method of instruction." Establishes tests and examinations as the sole criterion for the advancement of the student: "All students must take examinations for the complete course of each subject in the educational plans, and also to take tests in practical |  |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
|  |  |  |  |  | work...." Calls also for the taking of state examinations ("school-leaving examinations") by all graduates of higher educational institutions, and the defense of graduation projects by all graduates of Technicums. For all higher education graduates stipulates "matriculation certificates" (grade transcripts) on which are recorded all subjects studied and test results. Establishes two types of diplomas: "The diploma of the first level will be given to students who have graduated from a higher educational institution with marks of 'excellent' in no less than 3/4 of all subjects - with marks of 'satisfactory' in the rest, and to those who have passed all State examinations or who have defended graduation projects with an 'excellent'; the diploma of the second level will be given to all the rest of the students, who have graduated from higher educational institutions and who have passed examinations or have defended graduation projects." Those receiving the diploma of the first level are conferred certain employment and post-graduate study privileges. Stresses the importance of established order and firm discipline as prerequisites for a high quality of preparation of specialists. Orders "an exact schedule of studies and the strict observance of it; complete order in auditoriums, study rooms, ...."<br>Points out that without the development of scientific research work in the faculties, higher educational institutions would not be able to carry out the preparation of specialists at a level commensurate with contemporary scientific and economic demands. |  |

TABLE 24 - Continued

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| 4 July 1936 | "On pedological perversions in the system of people's commissariats" | TsK VKP(b) | Q1 | E S | Marks the official termination of progressive education and experimentation in the USSR. Brands "pedology" (the science of the development of the child conforming to the laws for his given age) as anti-Leninist and pseudo-scientific, since the "pedologization" of the pedagogical process came to be acknowledged as having resulted in the implementation of essentially anti-pedagogical methods of teaching. | bb (pp. 82-93) |
| 11 Nov. 1937 | "On the introduction of regular appointments and official salaries for the professional teaching staff in the VUZs" | SNK USSR | Q1 | H | Establishes a regular salary system, thereby raising the material condition and status of scientific and scientific-pedagogical cadres at the upper level of education. | p (p. 144)<br>aa (p. 19) |

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Bibliographic sources for "Compendium of Principal Legislation on Soviet Education, 1928-1937" (Table 24 ):

*a* S. V. Kaftanov, "Sostoianie i osnovnye zadachi sovetskoi vysshei shkoly" ["Conditions and Principal Tasks of the Soviet Higher School"], *Vysshaia shkola* [The Higher School], Nos. 6-7 (1938).

*b* Nikolai I. Boldyrev (ed.), *Direktivy VKP(b) i postanovleniia sovetskogo pravitel'stva o narodnom obrazovanii; sbornik dokumentov za 1917-1947 gody* [Directives of the All-Union Communist Party and Decrees of the Soviet Government on Public Education; a Collection of Documents for the Years 1917-1947], Vol. II (Moscow: Izd-vo Akademii pedagog. nauk RSFSR, 1947).

*c* U.S.S.R., Central Committee VKP(b), "Ob uluchshenii podgotovki novykh spetsialistov" ["On the Improvement of the Preparation of New Specialists"], A resolution adopted by the Plenum of the Central Committee VKP(b) on 12 July 1928, *Nauchnyi rabotnik* [Scientific Worker], No. 8-9 (Aug.-Sept., 1928).

*d* P. Valeskaln, "Povysit' kachestvo podgotovki spetsialistov" ["Raising the Quality of Preparation of Specialists"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 10 (Oct., 1932).

*e* A. Chaplin, "Tekhnikumy" ["Technicums"], *Malaia sovetskaia entsiklopediia* [Small Soviet Encyclopedia ], Vol. VIII (1932).

*f* Tsentral'noe statisticheskoe upravlenie Gosplana SSSR (TsSU) [Central Statistical Administration of Gosplan USSR (TsSU) ], *Kadry kul'turnogo stroitel'stva; osnovnye dannye o nauchno-prepodavatel'skikh rabotnikakh vuzov narkomprosa RSFSR po otdel'nym otrasliam znanii* [Cadres of Cultural Construction; Fundamental Data Concerning the Scientific-Teaching Workers of VUZs of Narkompros RSFSR in the Individual Branches of Knowledge ] (Moscow: Gos. uchebno-pedagog. izd-vo, 1931).

*g* P. Valeskaln, "Universitety na vysshuiu stupen'' ["Universities to a Higher Stage"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 4-5 (Apr.-May, 1933).

*h* Moscow. Universitet, *Moskovskii gosudarstvennyi universitet k XX letiiu velikoi sotsialisticheskoi revoliutsii* [Moscow State University on the 20th Anniversary of the Great Socialist Revolution] (Moscow: Izd. Moskovskogo gos. universiteta, 1937).

*i* Russia (1917-R.S.F.S.R.), Narodnyi komissariat prosveshcheniia [People's Commissariat of Education], *Universitety i nauchnye uchrezhdeniia* [Universities and Scientific Institutions] (Moscow-Leningrad: Ob'edinennoe Nauchno-Tekhnicheskoe Izdatel'stvo, 1935).

i "Soiuz sovetskikh sotsialisticheskokh respublic" ["Union of Soviet Socialist Republics"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II.

k A. Shokhin, "K perestroike nachal'noi i srednei shkoly" ["Toward the Reconstruction of the Elementary and Secondary School"], *Front nauki i tekniki* [Front of Science and Engineering], No. 9 (Sept., 1932).

l I. K. Andronov, "Polveka razvitiia matematicheskogo obrazovaniia v SSSR" ["A Half Century of Development of Mathematics Education"], *Matematika v shkole* [Mathematics in the School], No. 3 (May-June, 1955).

m Vladimir M. Bradis, *Metodika prepodavaniia matematiki v shkole* [Methods of Teaching Mathematics in the Secondary School] (Moscow: Gos. uchebno-ped. izd. Ministerstva prosveshcheniia RSFSR, 1954).

n F. F. Korolev, T. D. Korneichik, and Z. I. Ravkin, *Ocherki po istorii sovetskoi shkoly i pedagogiki* [Essays on the History of the Soviet School and Pedagogy] (Moscow: Izdatel'stvo akademii pedagogicheskikh nauk RSFSR, 1961).

o Russia (1917-R.S.F.S.R.), Narodnyi komissariat po prosveshcheniia [People's Commissariat of Education], *Gosudarstvennye universitety* [State Universities] (Moscow: Ogiz-izogiz, 1934).

p P. S. Aleksandrov, *et al.* (eds.), *Istoriia Moskovskogo universiteta* [History of Moscow University], Vol. II (Moscow: Izd. Moskovskogo universiteta, 1955).

q L. Povolotskii, "O gruppovykh zaniatiiakh i uchete znani" ["On Group Lessons and the Evaluation of Knowledge"], *Front nauki i tekhniki* [Front of Science and Engineering] No. 7 (July, 1934).

r D. Petrovskii, "Postanovlenie TsIK o vysshei shkole v destvii" ["Decree of the Central Executive Committee on the Higher School i Operation"], *Front nauki i tekhniki* [Front of Science and Engineeing], No. 9 (Sept., 1933).

s U.S.S.R., Council of People's Commissars, "Postanovlenii SNK ot 13/I 1934 g. - o podgotovke nauchnykh i nauchno-pedagogicheskikh rabotnikov" ["Decrees of the Council of People's Commissars USSR o Jan. 13, 1934 - on the Preparation of Scientific and Scientific-Pedagogical Workers"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 2 (Feb., 1934).

t A. Travina, "V vysshei attestatsionnoi komissii" ["In th Higher Certifying Commission"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 2 (Feb., 1934).

u U.S.S.R., Council of People's Commissars, "Postanovleniia SNK SSSR ot 13/I 1934 g...." ["Decrees of the Council of People's Commissars USSR of Jan. 13, 1934 - on Academic Degrees and Titles"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 2 (Feb., 1934).

v G. Z. Bereday, W. W. Brickman, and Gerald H. Read (eds.), *The Changing Soviet School* (Cambridge: The Riverside Press, 1960).

w George S. Counts, *The Challenge of Soviet Education* (New York: McGraw-Hill Book Company, Inc., 1957).

x G. Krzhizhanovskii, "Akademiia nauk v 1936 g." ["The Academy of Sciences in 1936"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 4 (April, 1936).

y Sergei I. Vavilov, *Tridtsat' let sovetskoi nauki* [Thirty Years of Soviet Science] (Moscow: Izd-vo Akademii nauk SSSR, 1947).

z U.S.S.R., Council of People's Commissars and Central Committee VKP(b), "Postanovlenie SNK SSSR i TsK VKP(b)" ["Decree of the Council of People's Commissars USSR and of the Central Committee VKP(b)"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 7 (July, 1936).

aa S. V. Kaftanov, "Sostoianie i osnovnye zadachi sovetskoi vysshei shkoly" ["Conditions and Principal Tasks of the Soviet Higher School"], *Vysshaia shkola* [The Higher School], No. 6-7 (June-July, 1938.

bb V. Kolbanovskii, "Tak nazyvaemaia pedologiia" ["So-Called 'Pedology'"]. *Front nauki i tekhniki* [Front of Science and Engineering]. No. 12 (Dec., 1936).

cc L. Vygodskii, "Pedologiia" ["Pedology"], *Malaia sovetskaia entsiklopediia* [Small Soviet Encyclopediia], Vol. VI (1931).

dd N. N. Nikitin, "Prepodavanie matematiki v sovetskoi shkole 1917-1947" ["Teaching of Mathematics in the Soviet School, 1917-1947"], Matematika v shkole [Mathematics in the School], No. 5 (Sept.-Oct., 1947).

ee Ruth C. Widmayer, "The Communist Party and the Soviet School--1917-1937" (unpublished Ph. D. dissertation, Department of Government, Radcliffe College, Harvard University, 1954).

ff "Gosudarstvennyi uchenyi sovet (GUS)" ["State Scientific Council (GUS)"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I.

## Evidences of continuity in mathematics educational policy between Imperial Russia and Soviet Russia of 1927-1929

While there were several references to mathematics in the legislation of the early 1930's (i.e., the 5 Sept. 1931, 25 Aug. 1932, and 12 Feb. 1933 decrees of the TsK VKP(b) ), the decrees did not go into much detail with regard to the specifics of mathematics instruction. The fact alone that the first of these decrees, that of 5 Sept. 1931, condemned "any attempt to separate polytechnization of the schools from the systematic and thorough assimilation of the sciences, particularly physics, chemistry, and mathematics...,"[27] indicates some frustration of the obvious attempt in 1927 to return to traditional programs and practices in the teaching of the individual disciplines. In general, however, the educational policy of 1927-1929 tended to reflect and to build upon the trend established with the adoption of the curriculum for Grades V-VII (First Cycle of the Second Level) in 1927,[28] whereby the individual disciplines were restored to their traditional place of eminence. It was with this restoration of the individual disciplines as the basis of the educational process at the time that continuity in educational policy between Imperial and Soviet Russia reemerged.

A comparison of the 1927 curriculum for Grades V-VII of the Second Level with the curricula of the Gymnasia under the 1916 Ignatiev Plan for the corresponding classes (IV-VII) is quite revealing.[29]

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[27] Supra, p.293 (quoting 5 Sept. 1931 decree of the TsK VKP(b) "On the elementary and secondary school").

[28] Supra, p.279 (Table 23 --Curriculum of the First Cycle of the Second Level of the Unified Labor School [ 1927 ] ).

[29] Cf. p.42 (Table 5--Secondary School Curricula Under the Ignatiev Plan [ 1916 ] and p. 279 (Table 23 --Curriculum of the First Cycle of the Second Level of the Unified Labor School [ 1927 ] ).

Whether based on the types of disciplines offered or on the number of class hours per week and the proportion of time accorded to each of the separate disciplines, the comparison is favorable overall. For instance, the proportions of time on mathematics in Classes IV-VII of the Classical, Modern Humanities, and Real Gymnasia in 1916 were 11.9%, 14.9%, and 17.2%, respectively,[30] compared to the 12.1% proportion for Grades V-VII of the 1927 Unified Labor School. A comparison of many of the other subjects also points up a significant degree of correspondence.

If the comparison is made to include Grades VIII-IX of the Nine-Year Unified Labor School, the traditional orientation of the Second Level in 1927 becomes even more obvious, primarily because the study of the individual disciplines had remained as the basis of studies in the Second Cycle without any noticeable alteration. Such a comparison is made difficult, however, by the division of the Second Cycle into three vocational biases,[31] which included the study of "special subjects" peculiar only to a given bias. These "special subjects" accounted for 7-9 hours and 11-13 hours of weekly classroom hours for Grades VIII and IX, respectively, in addition to the "general-educational subjects," which were common to biases.[32] Hence, for purposes of comparison, the figures cited in the table below do not include the "special subjects" of Grades VIII and IX:

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[30] _Supra_,p.44 (Table 6--Comparison of Mathematics Curricula of Pre-Revolutionary Secondary Schools...).

[31] _Supra_,p.250.The three biases of the Second Cycle of the Second Level of the Unified Labor School included: 1) the pedagogical bias; 2) the cooperative bias; 3) the administrative bias.

[32] Korolev, _op. cit_., p. 80.

## TABLE 25

## CURRICULUM OF THE SECOND LEVEL OF THE UNIFIED LABOR SCHOOL IN 1927[33] (EXCLUDING THE "SPECIAL SUBJECTS" OF GRADES VIII AND IX)

| Subject | GRADES | | | |
|---|---|---|---|---|
| | Second Cycle | | Second Level | |
| | VIII | IX | V - IX | |
| | hrs/wk | hrs/sk | hrs/wk | % /wk |
| Political Literary | 5 | 4 | 21 | 13.0 |
| Russian Language & Lit. | 4 | 4 | 22 | 13.6 |
| Mathematics | 4 | 4 | 21 | 13.0 |
| Natural Science | 3 | 3 | 17 | 10.6 |
| Chemistry | 2 | 2 | 9 | 5.6 |
| Physics | 3 | 3 | 18 | 11.2 |
| Foreign Languages | 2 | 2 | 13 | 8.1 |
| Fine Art | 2 | 1 | 9 | 5.6 |
| Singing and Music | 2 | 1 | 8 | 5.0 |
| Physical Culture | 2 | 1 | 8 | 5.0 |
| Geography | 0 | 0 | 6 | 3.7 |
| Manual Work | 0 | 0 | 9 | 5.6 |
| Total | 29 | 25 | 161 | 100.0 |

The relative amount of 13.0% allocation of classroom time to the study of mathematics in 1927 is well within the corresponding 11.9%-17.2% range of the Imperial Gymnasia in 1916. Similar to the comparison for Grades V-VII, a comparison of most of the other subjects for Grades V-IX would also reveal significant degrees of correspondence with late-Imperial norms in secondary education. The absolute amount of time apportioned to mathematics in the 1927 Second Level School is even more indicative of its traditional resemblance considering that it averaged 4.2 hours per week for each grade /‾21 hours/week divided by 5 (# of grades in the Second Level) _/, as compared to 4.25 hours per week in each class of the 1916 Real Gymnasia /‾17 hours/week divided by 4 (# of classes in the Second Level of the Imperial Gymnasia) _/[34]--the most math/science-oriented institutions of Imperial secondary education!

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[33] Figures for the Second Cycle (Grades VIII and IX) compiled from data in Korolev, loc. cit.; figures for the Second Level totals obtained by combining data from Table 23 (Curriculum of the First Cycle of the Second Level of the Unified Labor School [1927] with the figures for the Second Cycle.

Yet, the similarities in the secondary school curricula of Imperial Russia in 1916 and of Soviet Russia in 1927, particularly in mathematics, were not just quantitative in scope. The return by the State Scientific Council (GUS) to a subject-centered curriculum for Grades V-VII in 1927 had as its aim the improvement of the preparation of students in the individual disciplines having general educational importance. However, such preparation could not be achieved by *quantitative* changes in the curriculum alone, since it "was inseparably linked with the deepening of the working-out of both general and especially particular methods...."[35] Indeed, the Presidium of the Scientific-Pedagogical Section (NPS) of the GUS at its meeting of 24 March 1927 recognized this need for *qualitative* changes when it acknowledged that "before Glavsotsvos the task of working out instructions on methods of teaching now rises to first place."[36]

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[34] Cf. *p*.42 (*T*able 5--Secondary School Curricula Under the Ignatiev Plan /‾1916_/ ).

[35] Korolev, *op. cit*., p. 156.

[36] Arkhiv Minprosa RSFSR, f*.* GUSa /‾Archives of the Ministry of Education RSFSR, entry of the GUS_/, *Protokoly zasedaniia NPS GUSa 23 sentiabria 1927 g.-28 febralia 1928* /‾Minutes of Meetings of the Scientific-Pedagogical Section of the GUS of 23 Sept. 1927 - 28 Feb. 1928_/, Record of Proceedings no. 3, 1. 8, cited by Korolev, *ibid*.

Accordingly, the Scientific-Pedagogical Section of the GUS adopted a special plan for working out methods of teaching peculiar to each general educational discipline, such that the content and the methodology of the discipline were to have been taken seriously into account so as to enable the given teaching method to be compatible with them.[37] In drawing up this plan the GUS also included the study of methods of "complex" teaching. However, even this work was supposed to be guided by the results of the work on particular disciplinary methods, thereby officially acknowledging the study of questions relating to the method of "complex" teaching to be a task of secondary significance! Korolev describes this phenomenon as "a fact of no small importance, which testifies to the emergence of new positive tendencies in the program-methodological work of the GUS."[38] *These "new positive tendencies" represented qualitative changes, which, in conjunction with the transfer to a curriculum recognizing the primacy of the individual disciplines, moved to restore the integrity of methods in teaching peculiar to each of these disciplines*.

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[37] Arkhiv Minprosa RSFSR, *f.* GUSa [Archives of the Ministry of Education RSFSR, entry of the GUS], *Protokoly zasedanii prezidiuma NPS GUSa 18 sentiabria 1927 g. - 28 febralia 1928 g.* [Minutes of Meetings of the Presidium of the Scientific-Pedagogical Section of the GUS of 18 Sept. 1927 - 28 Feb. 1928], 1. 5, cited by Korolev, *ibid*.

[38] *Ibid*. Even Madame N. K. Krupskaia, V. I. Lenin's widow, who with P. P. Blonskii formed the most influential coalition for highly liberal educational reforms, admitted at a meeting of the Presidium of the Scientific-Pedagogical Section of the GUS on 25 January 1928:

> *Contemporary methods went very far ahead of those methods, which formerly existed*. We should define a common purpose for all methods - how they are oriented on the new pupil, how necessary it is to select the most important material so as not to overload the student, and how to connect theory with practice. (Italics mine.) *Ibid*.

The curriculum of the Second Level of the Unified Labor School in 1927 has been shown to be analogous, in a quantitative regard, to the educational programs of late-Imperial Russia. In addition, it has been shown that a concerted effort was made to focus on qualitative considerations, which were commensurate with this curriculum. The problem remains, however, as to whether or not the qualitative changes that were forthcoming were also traditional in scope; that is, to what extent did they approximate pre-Revolutionary educational policies and practices? The answer to this question appears quite evident in the following characterization of the Glavsotsvos, which was based on its school inspectors' investigations in the late-1920's of the state of mathematics instruction in schools of a "raised type," that is, in schools of the Second Level:

> Courses are based on logic, strictly systematized....The method - strict deduction, explanation....In the construction and organization of the course of mathematics the programs for entrance into the technicums and VUZs render significant influence.[39]

This description might well have served as a blueprint for educational policy regarding the teaching of mathematics, which prevailed in the Imperial Russian Gymnasia! Nonetheless, it should not be considered to be exactly representative of the quality or nature of teaching in all the academic disciplines in the latter part of the 1920's. It might even be ventured that conditions in mathematics teaching at this time provide an exaggerated indication of academic conditions generally prevailing at the time, since all of the literature tends to imply that, beginning with the 1926/1927 academic year, special attention was devoted to the improvement of the teaching of mathematics and physics.[40] The advent of the First Five-Year Plan, as already indicated, made much heavier demands on professional secondary institutions (principally the FZU and Technicums) and VUZs to raise the number, and eventually the quality of preparation, of scientific specialists turned out. Hence, the teachers of these institutions exerted pressure on the Unified Labor School to examine the quality of its preparation, particularly in relation to those subjects the mastery of the knowledge and skills of which was mandatory for the preparation of scientific workers and cadres--namely, mathematics and physics.

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[39] Arkhiv Minprosa RSFSR, f. Glavsotsvos /̄ Archives of the Ministry of Education RSFSR, entry of the Glavsotsvos_/, op. 7, sv. 11, por. No. 68, l. 83, cited by Korolev, ibid., p. 176.

The most convincing evidence, however, of the transition of the teaching of mathematics from progressive-experimental tendencies to traditional tendencies, was the demise of the concept of "fusionism," which was the basic principle underlying the "complex system" of teaching. "Fusionism," as applied to mathematics, is the capacity of mathematics, as a unified discipline, to allow its different branches to be brought into some meaningful relationship so as to bear upon the solution of some given problem or task. The importance of this property in the teaching of mathematics is that it can work either to the advantage or to the disadvantage of the student. For instance, for the solution of a particular task it might be necessary to apply both algebra and geometry, in which case the pupil must be trained to recognize such a need and to employ his knowledge of the different branches as required. Suppose, on the other hand, that a given task is able to be solved by either algebra or geometry. Contrary to the previous situation, wherein the pupil has to combine his knowledge of both branches, here the problem is to train him to discriminate as to which one (algebra or geometry) most readily facilitates finding the correct solution. Soviet pedagogy in the 1920's recognized in the concept of fusionism the "golden thread," which united all the branches of mathematics. If an understanding of this principle and ways of utilizing it to his advantage could be inculcated in the pupil, then he could be said to have mastered mathematics. The "complex" was deemed the vehicle of instruction, which was best able to achieve this goal.

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[40] _Ibid_., p. 174.

Ironically, the failure of the "complex system" of teaching to take hold in the grades of the Second Level was precisely due, for the most part, to its inability to achieve adequate results with respect to the concept of "fusionism." This defect was finally recognized by the Glavsotsvos in 1929 in one of its publications:

> The problem concerning the teaching of a single mathematics represents a problem itself, which was placed before the school and which, even up to the present time, has not been completely solved. Arithmetic material is relatively easily united with algebra, trigonometry - with geometry, problems of metric geometry with algebra and arithmetic. The complete unification of algebra with geometry is the most difficult....[41]

That the concept of fusionism had already found increasingly less support is evident from some of the methodological literature on mathematics at the time. Even eminent mathematics methodologists, such as O. Vol'berg and Ia. Perel'man, respected highly as pro-Soviet pedagogues, in 1930 came out against "fusionism" in the journal Physics, Chemistry, Mathematics, and Techniques in the Labor School /‾Fizika, khimiia, matematika, tekhnika v trudovoi shkole _7. The essence of their argument was that "unity of mathematics" or "a higher synthesis" in mathematics, phrases synonymous with the concept of fusionism, could only be achieved in higher mathematics,[42] since this was a very complicated process, from which the Unified Labor School was far removed. Thus, they proceeded to attack sharply the GUS-approved programs and publications:

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[41] I. Veksler and P. Kharitonovoi (eds.), Vtoraia stupen' trudovoi shkol / The Second Level of the Labor School / (Moscow: Glavsotsvos, 1929), p. 243, cited by Korolev, *ibid*., p. 175.

> Instead of a synthesis, to us they present an unsystematic and higgledy-piggledy alternation of algebra and geometry chapters; unified mathematics disintegrated into a number of fragments; instead of unity there was obtained chaos.[43]

The highlight of their criticism was their comparison of the facetiosness of "fusionism" in mathematics ("a jumbled mixture of algebra and geometry") to an attempt to merge the various scientific disciplines, which must be used simultaneously to solve complex problems of life, into a "single super-science"![44] Considering that O. A. Vol'berg was formerly the Chairman of the Mathematics Section of the School Reform Bureau, the first and most radically progressive institution for educational reform in the early years of the Soviet Union, who, throughout most of the 1920's was a leading proponent of non-traditional reforms in mathematics teaching,[45] his polemics were prophetic of the dissolution of the GUS by the decree of the TsIK USSR and the SNK USSR of 19 Sept. 1932!

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[42] As examples of "fusionism" in higher mathematics, Vol'berg and Perel'man suggested that "in analytical geometry, geometry is partially fused with algebra; in differential geometry - with analysis; trigonometry, which constitutes a part of geometry, is a principal study on elliptical functions;...." O. Vol'berg and Ia. Perel'man, Fizika, khimiia, matematika, tekhnika v trudovoi shkole /‾Physics, Chemistry, Mathematics, and Techniques in the Labor School _7, No. 4 (1930), 13, cited by Korolev, ibid., p. 177.

[43] Vol'berg and Perel'man, ibid.

[44] Vol'berg and Perel'man, ibid. The term "unified super-science" is taken from the context of Volberg's and Perel'man's satire on the expanded connotation of "edinaia mauka" /‾"single science"_7.

The period from 1926-1930 was a pivotal one in relation to the quality of teaching in the schools. While it can be described as a period witnessing the continuous dissolution of the "complex" in teaching, it is more fitting to refer to it as the period wherein the ideological/pedagogical basis of the "complex," the principle of fusionism, was repudiated. This repudiation was prevalent not only in the educational policy and programs of the Government, but also in the "semi-official" actions of local education administrations and in the unofficial literature in the various fields of education, where questions of purpose, content, and methodology were thrashed out and debated. Hence, the downfall of the "complex," which was tantamount also to the repudiation of the principle of "fusionism," was the result of consciously directed, formal, educational policy and of "informal" educational policy.

Quality in teaching, particularly at the Second Level, had to be reconciled to a new set of conditions, which came to pervade the education system. Such conditioning factors as the subject-oriented curriculum, systematically structured courses, and tendencies toward logical and deductive methods in the educational process have already been touched upon. In an endeavor to downplay "creeping empiricism" in he teaching of mathematics,[46] experimental proofs of a mathematical truth had to be accompanied by logical or theoretical proofs of the same material.

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[45] It is interesting to compare Vol'berg's above criticism (1930) of the GUS programs with his views on pedagogy in Narodnoe prosveshchenie / Public Education / in 1919. Cf. p. 145.

Despite all of these changes in conditions impinging upon te quality of teaching, the fundamental criterion of quality in educaton overall remained unchanged: the social and political criterion of nculcating pupils with a materialistic outlook at the world surroundng them. The dominance of this aim in the educational process, with is extreme emphasis on the application of mathematical learning to the solution of practical problems in life (i.e., the treatment of statistical information, drawing of diagrams and graphs, finding of aras and volumes), precluded at the outset what might have been a really accelerated improvement in the academic preparation of pupils, espeially in mathematics. In the wake of the dissolution of the "complex, all indications pointed to a "great leap forward" in education. Evn the curriculum recommended by Narkompros in 1927 for the increasingy popular Factory-and-Workshop Seven-Year Schools (FZS) approximated he subject-centered curriculum just adopted at the time for the First Cycle of the Second Level of the Unified Labor School. Whereas the FZS devoted more hours to chemistry and manual work and fewer hoursto natural science and singing than did the Unified Labor School for Gades V-VII, the number of hours in most individual subjects, including mathematics and physics, were identical.[47] The addition of a tenth year of study to the Unified Labor School (specifically, to the Second Level) in 1929 by the decree of the SNK RSFSR[48] was no less a reason for optimism than the curriculum, which was adopted by it for the Second Level of the new Ten-Year Unified Labor School on 26 August 1929:

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[46] Korolev, loc. cit.

TABLE 26

EDUCATION PLAN OF THE SECOND LEVEL OF THE TEN-YEAR SCHOOL (1929)[49]
(HOURS PER WEEK)

| Subject | Grades | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Cycle I | | | Cycle II | | | | |
| | V | VI | VII | VIII | IX | X | Hrs. | % |
| Social Sciences | 4 | 4 | 4 | 3 | 4 | 4 | 23 | 11.2 |
| Russian Language and Literature | 5 | 4 | 4 | 3 | 3 | 3 | 22 | 10.7 |
| Mathematics | 6 | 4 | 4 | 3 | 3 | 3 | 23 | 11.2 |
| Natural Sciences | 4 | 3 | 4 | 2 | 2 | 2 | 17 | 8.2 |
| Chemistry | - | 2 | 2 | 2 | 2 | 2 | 10 | 4.9 |
| Physics | - | 3 | 4 | 4 | 3 | 3 | 17 | 8.2 |
| Astronomy | - | - | - | - | 2 | - | 2 | 1.0 |
| Geography | 2 | 2 | 2 | - | - | - | 6 | 2.9 |
| Economic Geography | - | - | - | 2 | - | - | 2 | 1.0 |
| Foreign Language | 3 | 2 | 2 | 2 | 2 | 2 | 13 | 6.3 |
| Fine Arts | 2 | 2 | 2 | - | - | - | 6 | 2.9 |
| Physical Culture | 2 | 2 | 2 | 2 | 2 | 2 | 12 | 5.8 |
| Labor | 3 | 3 | 3 | - | - | - | 9 | 4.4 |
| Music (singing) | 1 | 1 | 1 | - | - | - | 3 | 1.4 |
| Reserve for Second Cycle "special disciplines" (depending on the nature of the bias) | - | - | - | 13 | 13 | 15 | 41 | 19.9 |
| Total | 32 | 32 | 34 | 36 | 36 | 36 | 206 | 100.0 |

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[47] Cf. table on the "Project of the Educational Plan of the FZS" in Korolev, *ibid*., p. 82.

[48] Cf. 290 (Table 24--Compendium of Principal Legislation on Soviet Education, 1928-1937), SNK RSFSR decree "On the introduction of a ten-year period of study."

[49] Korolev, *op. cit.*, 97.

Discounting the number of hours (41) reserved in the Second Cycle for "special disciplines," which were apportioned among the vocational biases, 13.9% of the 165 remaining hours were devoted to mathematics. Compared to the 1927 curriculum,[50] there was a two hour-per-week increase in mathematics, amounting to a relative increase of almost 1%. A proportionate increase was also reflected in such subjects as social science, Russian language and literature, and physics, knowledge of all of which was important for the preparation of students for Technicums and higher educational institutions. These increases reflect the admonition of the July Plenum of the Central Committee VKP(b) in 1928 to raise the academic preparation of graduates of Second Level Schools. Their purpose, as reflected in mathematics, where the addition of one whole grade (X) accounted for a weekly increase in mathematics in the Second Cycle of only one hour (9 hours [1929] versus 8 hours [1927]), was to eliminate overloading by spreading the academic content over a larger time interval -- thereby hopefully reducing the amount of superficial learning by prospective scientific cadres.[51] It seemed as though the slogan devised by Vol'berg and Perel'man, "Go separately, Fight together,"[52] stressing the integrity of the individual disciplines, had come to describe the prevailing pedagogical tenor in Soviet educational policy by 1930! However, events in elementary education in 1929, as well as legislation enacted in the early 1930's, dispelled such an illusion!

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[50] Cf. p.312 (Table 25 --Curriculum of the Second Level of the Unified Labor School in 1927).

[51] Korolev, loc. cit.

[52] Vol'berg and Perel'man, loc. cit.

## The response of the Soviet elementary school of the late-twenties and early-thirties: the momentum of the "complex" versus the reinstatement of traditional policies

The curriculum of the Second Level of the Unified Labor School underwent a fundamental change in 1927 in response to criticism directed at it, whereas the "complex system" of teaching, for reasons already indicated, had fared much better in the elementary grades (I-IV) of the First Level. While the programs of Grade IV were subjected to certain significant changes,[53] there was no basic revision of either the urban or the rural versions of the GUS "complex" programs at this level in 1927.[54] The "complex system" of teaching was preserved in its entirety. Nonetheless, the transfer to a subject-oriented curriculum in the Second Level did find reflection in the First Level programs approved for 1927. Namely, in them the GUS enumerated the content and skills, which were to be covered in each of the individual disciplinex.[55] Unlike the 1929 programs of the Second Level, however, which maintained their orientation toward the individual disciplines, the accompanying programs in the First Level at this time did not follow up on even the most minimal of notions in this direction. Instead, the "pendulum effect," so common to both Imperial and Soviet educational policy, once again manifested itself. That is, educational policy of the First Level in 1929 began another downward swing--this time to the left. This arc approximated the one traversed in 1923-1925, when Soviet educational policy, through the methodological instrument of the "complex," succumbed to the unrealistic prods of Soviet political-economic ideology. However, whereas the aim of the "complex" previously was to prepare elementary pupils for life generally, the renovations in the 1929 programs were more specifically slanted toward the *polytechnical training of the pupils for life in a rapidly industrializing society*, as suggested in the introduction to them:

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[53] Material on history and geography was reduced, while that on "political literacy" (including studies on the class struggle, socialist construction, and the industrialization of the country) was increased. Korolev, op. cit., 96.

[54] It is difficult to ascertain exactly when a distinction was made in the "complex" programs of the GUS as to whether they were for use in urban or rural educational districts. This practice, however, appears to have been firmly established by 1927.

[55] Korolev, op. cit., p. 97.

> The school must be in step with the rate of economic-political development of the country, and in the programs of the school this rate must receive reflection, otherwise the school will not be able to fulfill its basic tasks of training - to prepare children for life, for participation in the [class] struggle and [socialist] construction.[56]

This accent on polytechnical training became much more pronounced with the passage of legislation in 1930 calling for the reorganization of the Second Cycles of the Second Levels of the Unified Labor School into Technicums.[57] The result was that the significantly polytechnically-based Factory-and-Workshop Seven-Year School (FZS) in the urban industrializing centers (and the School of Peasant Youth (ShKM) in the rural agricultural areas) became the principal type of general educational school.[58] Such an accelerated rise to prominence required the introduction too of new programs into the FZS.

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[56] *Ibid*., p. 96.

[57] Cf. p. 291(Table 24 --Compendium of Principal Legislation on Soviet Education, 1928-1937), decree of the Second All-Union Party Conference on Public Education of 25 July 1930.

The newly adopted curriculum of the FZS in 1927 was indicated to have been very similar to that of the First Cycle of the Second Level of the Unified Labor School,[59] which then had just made the individual disciplines the basis for the instructional process in lieu of the "complex." As was true for the Unified Labor School at the secondary level, the program materials for the FZS (which were only mimeographed in form) in 1929 remained essentially unchanged from the 1927 programs. Prior to 1930, the "pendulum effect" had only been felt at the elementary level of schooling. It too now made its mark on the secondary educational level, and the FZS served as its point of entry. Since the Factory-and-Workshop School was based on the First Level of the Unified Labor School, it comes as no surprise that the latter's increased concern for polytechnical training should be evidenced in the changes forthcoming in the programs of the FZS. The pedagogical principle incorporated to accommodate these changes is less understandable, however, since in the FZS there was not only restored the "complex system" of teaching, which had failed to prove itself in practice over a reasonable length of time, particularly at this (the secondary) level, but also, its extremism was improved upon! The new programs of the FZS, based on this so-called "complex-project system" of teaching, after having been discussed by the All-Russian Conference of Workers of the FZS (28-30 April 1930) and approved by Narkompros, were implemented at the beginning of the 1930/1931 academic year.[60] Just as the First Level of the Unified Labor School influenced the programs of the FZS, so too was the reverse true. "Complex-project" programs almost simultaneously were worked out for and implemented in the elementary schools of the First Level. The period wherein the concept of polytechnical education really emerged and "the labor school became the polytechnical school"[61] had arrived. The convocation of the First All-Russian Congress on Polytechnical Education in Moscow in August 1930[62] serves as additional testimony to this fact.

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[58] Cf.p. 277. In addition to its documentation in "fabrichno-zavodskaia semiletka (FZS)" /̲ "Factory-and-Workshop Seven-Year School"_/, Pedagogicheskii slovar' /̲ Pedagogical Dictionary_/, Vol. II, 554, this fact is also corroborated in Korolev, op. cit., p. 98.

[59] Supra, p. 320.

The "complex-project system" of teaching, more commonly designated in Soviet literature as the "laboratory-brigade method" of teaching, represented an attempt "radically to correct the assumed mistakes and distortions, which led to the numbness of the complex system,"[63] while simultaneously retaining the essential characteristics and basic principle of the "complex." The chief distinction between the "complex" and "complex-project" systems of teaching, both of which were varieties of the American Dalton Plan, was in the manner in which pupils were grouped for study under each of them. Whereas the system of the "complex" retained the traditional practice of grouping them by class-sized groups, that is, according to whole grades, that of the "complex-project" abolished this form of organization exclusively in favor of numerically smaller children's collectives or "brigades."[64] Through its flexibility, the work unit of the brigade supposedly afforded the pupils an unprecedented opportunity to display their initiative, and was envisaged as that form of organization, which would allow for the gradual overcoming of the authoritarianism of the school.[65] The "complex-project system" of teaching meant, in essence, that each *brigade* carried out *projects* as the means by which the study of educational material relating to a given "*complex*" theme was pursued. These projects included independent laboratory work of the brigade, as well as the reading of books, the compiling of reports, and the solution of problems in the brigade.[66] The chief similarity between the "complex" and the "complex-project" systems of teaching obviously was their mutual denial of the traditional subject-system and a dedication to the "complex," as the basis for the construction of educational programs. A glance at the program of the First Level for the 1930/1931 academic year, although newly based on the "complex-project system" of teaching, shows it to be almost indistinguishable from the earlier programs based on the "complex system" of teaching (1923-1930), since "complexes" of a like nature formed the academic basis of both types. Another important similarity between them was the relegation to the teacher of strictly control-type functions in the educational process.

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[60] Korolev, loc. cit. The "complex-project" programs combined certain ideas emanating from the work of two separate groups:

1) the Educational-Methodological Council of Narkompros, headed by Ia. Vyshinskii;
2) the Institute of Methods of School Work, headed by V. Shul'gin and M. Krupenin. Ibid.

[61] George S. Counts, The Challenge of Soviet Education (New York: McGraw-Hill Book Company, Inc., 1957), p. 66.

[62] Ibid.

[63] Uchebno-metodicheskii sektor Narkomprosa [Educational-Methodological Sector of Narkompros], Programmy FZS [Programs of the FZS] (Moscow: Gosizdat., 1930), p. 25.

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[64] "Laboratorno-brigadnyi metod" [Laboratory-brigade Method"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I, 594.

[65] Uchebno-metodicheskii sektor Narkomprosa [Educational-Methodological Sector of Narkompros], *loc. cit.*

[66] "Laboratorno-brigadnyi metod" ["Laboratory-brigade Method"], *loc. cit.*

Why did the People's Commissariat of Education reverse the natural course of educational policy begun in the late-1920's--a course that witnessed a resurgence of concern for quality of academic preparation as a prime determinant of educational policy at the secondary level of schooling? Why did it once again attempt to surmount the weaknesses of a "tried-and-tested-and-failed" progressive reform? Even the elementary schools of the First Level demonstrated positive signs toward the systematization of academic instruction as early as 1927 in listing the content and skills to be acquired by the pupils in the area of mathematics, even if such content and skills were to be disseminated via the "complex system" of teaching! For what reason could Soviet policy-makers again be reconciled to the same, seemingly unconvincing arguments of the authors of such extreme programs? The following diatribe contained in the introduction to the 1930 Programs of the FZS /_Programmy FZS_7 appears to have added nothing new to the dialogue, which originally succeeded in replacing the individual subjects, including mathematics, with the "complex":

> The old program in language and mathematics gave only a volume of skills and bore therefore a formal character, which was isolated from the general content of school work. The new programs, which are now published in language and mathematics, eliminate this formalism and isolation of the construction of the programs for skills: they give a volume of skills on the basis of such concrete forms of speech practice and such types of practical problems of life, which

> place the work on language and mathematics at the service of general tasks of socialist construction.[67]

There are several plausible arguments for the success of this final rally of progressive educational reform in 1930-1931, none of which is able to stand alone. Three such arguments are summarized as follows:

1) A disenchantment with the academic achievements of 1926-1927 resulting from an announcement by the Glavprofobr of the results of the fall 1929 examinations for entrance into higher educational institutions, which indicated an insignificant improvement in comparison with the year before, such that the general level of academic preparation continued to be extremely low.[68]

2) The renewal of much of the bitter class antagonism with the second systematic and militant purge by the Party of the political, economic, and cultural institutions of the Soviet Union, which occurred throughout 1929 (the first systematic purge was conducted in 1921 in conjunction with the launching of the New Economic Policy). Within the framework of the cultural institutions, much of the Party hostility was directed at the educational process generally and at numerous educational/scientific institutions specifically.

The general effect on the educational process in schools at all levels was a pronounced suspicion of all things smacking of traditional content and methodology. Hence, the movement toward reinstating the traditional subject-orientation of school curricula and the stability resulting from this tendency became suspect, while educational processes associated with the class struggle and the socialist construction of the economy via the First Five-Year Plan once again came to the fore under a barrage of Party propaganda.

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[67] Uchebno-metodicheskii sektor Narkomprosa /‾Educational-Methodological Sector of Narkompros_/, op. cit., p. 99.

[68] Glavprofobr, Ob uluchshenii kachestva raboty shkoly II stupeni /‾On Improvement of the Quality of Work of the School of the Second Level_/, Letter no. 14 (Gosizdat, 1929), p. 7.

The effects of the purge, with its upsurge of Party activity and concomitant militant nationalism, were felt in such educational/scientific institutions as the Second Level of the Unified Labor School, higher educational institutions generally, the Academy of Sciences USSR and other scientific-research institutions, and the Moscow Mathematics Society.[69] The impact on all of these institutions was much the same--

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[69] Taking these institutions in the order mentioned, some of the specific results of the 1929 purge and related Party activities were as follows:

Unified Labor School: The decree of 25 July 1930 of the TsK VKP(b), emanating from the Second Party Conference on Public Education, according to which the polytechnically oriented Technicums were to replace the Second Cycle of the Second Level, seriously disenfranchised the Unified Labor School, resulted in the Factory-and-Workshop Seven-Year School (FZS) becoming the principal type of general education school, and led to the eventual abolition of the Unified Labor School by the decree of the TsK VKP(b) of 5 Sept. 1931.

Higher educational institutions: Decrees resulting from the Plenum of the TsK VKP(b) in November 1929 radically reorganized all industrial-technical education on a specialized polytechnical basis. (Cf. Table 24,p.290--the November 1929 decrees of the Plenum of the TsVKP(b)). In addition, elections and re-elections of professors were called for in all higher educational institutions, which, in effect, purged many ideologically alien intellectuals from their ranks. For a rather extensive analysis of these elections, see K. V. Ostrovitianov, "Zadachi novogo uchebnogo goda i uroki perevykov" /"Tasks of the New Academic Year and Lessons from the Elections"/, Nauchnyi rabotnik /Scientific Worker/, No. 9 (September, 1929), pp. 3-7. For a detailed account of other aspects of Party interference in 1929, see David Joravsky, Soviet Marxism and Natural Science, 1917-1932 (New York: Columbia University Press, 1961), particularly Chapter 16, "The Great Break for Natural Scientists."

Academy of Sciences USSR: The selection and election of new academicians, including the re-election of former academicians, as well as the appointment of a commission to purge the Academy of supposed reactionaries (and the fulfillment of its recommendations in Nov. 1929), occurred in 1928/1929--the chronological beginning of the reconstruction of the Academy of a reshaping of their activities to coincide with the dictates of the Party, that is, of the Soviet regime.

3) The emergence of the rudimentary pattern of long-range planning in the development of Soviet society, which came to characterize Soviet centralized administration around 1931 and became increasingly sophisticated thereafter. One of the basic tenets according to which this planning functioned, be it in Soviet education or in other cultural, political, and economic realms of Soviet society, was Lenin's tactic of retreating in order to get more space for a longer jump forward, that is, to trade time for space. Correspondingly, the analysis of Hessen and Hans depicts this "retreat" around 1927 as not really intended as an attempt by the Soviets to stabilize the educational programs at the outset.[70] On the contrary, it was a

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Sciences. For a comprehensive discussion of the particulars of rapidly accelerated Party and Government involvement in the affairs of the Union Academy of Sciences at this time, see V. A. Zelenko, "Rekonstruktsiia vsesoiuznoi akademii nauk" ["Reconstruction of the All-Union Academy of Sciences"], *Nauchnyi rabotnik* [Scientific Worker], Nos. 11-12 (Nov.-Dec., 1930), pp. 50-66. For a detailed treatment of the pivotal years of the reconstruction of the Academy of Sciences along strong centralized Party lines, see Loren R. Graham, "The Transformation of Russian Science and the Academy of Sciences, 1927-1932" (unpublished Ph. D. dissertation, Dept. of Political Science, Columbia University, 1964).

*Moscow Mathematics Society*: The attack on D. F. Egorov, president of the Society, began during his re-election to Moscow University in 1929. (David Joravsky, "Soviet Scientists and the Great Break," *Daedalus*, Vol. 89, No. 3 (Summer, 1960), 572.) The Society itself in 1929/1930 sustained sharp criticism for its apathy toward the practical problems of socialist construction. While its members recanted certain of the traditions, policies, and recent acts of the Society in 1930, it was forced to stop functioning for all of 1931. For interesting accounts of the criticisms and charges levelled at the Moscow Mathematics Society and its members at this time (dealing with matters of ideology, policies, and activities), which, in addition, vividly portray the official attitude of the Party and of the Government toward the role of science and scientists with the inception of the First Five-Year Plan, see:

I. Zaidenvar, "Oktiabr' v matematicheskam obshchestve i v institute mekhaniki i matematiki" ["October in the Mathematics Society and in the Institute of Mechanics and Mathematics"], *Varnitso* [changed to *Front nauki*

[70] Hessen and Hans, *op. cit.*, p. 226.

consciously conceived delay enabling them to marshal the means, power, and techniques to take an even bigger jump ahead of traditional policies and practices. Indeed, the political jump made by the programs of the First Level and the FZS in 1929-1930 propelled them far beyond the jump of the 1923-1925 *Programs of the GUS*!

## *Effects on the teaching of mathematics of the "leap forward" in education in 1929-1930*

The cumulative impact of events in education in 1929-1930, capped by the introduction of programs "on the basis of complexes of projects"[71] into the First Level Schools and the FZS, proved to be disastrous to the teaching of mathematics in the schools. A survey of these "complex-projects," which, with their political demeanor, comprised the program for Grades I-IV of the Unified Labor School in 1930,[72] shows that they absolutely negated the systematic study of mathematics. Korolev observes: "In the work in these programs there were eliminated not formalism and isolation of educational subjects, but Russian language and mathematics - these most important educational-training academic subjects."[73] Even at the secondary level of education--in the FZS--the students, involved

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*i tekhniki* in 1932_7, Nos. 11-12 (Nov.-Dec., 1930), 73-74.

A. A. Liusternik, L. G. Shnirel'man, A. Gel'fond, *et al.*, "*Deklaratsiia initsiativnoi gruppy po reorganizatsii matematicheskogo obshchestva*" /"Declaration of a Group Taking the Initiative for the Reorganization of the Mathematical Society"_7, *Nauchnyi rabotnik* /Scientific Worker_7, Nos. 11-12 (Nov.-Dec., 1930), 67-71.

[71] Korolev, *op. cit.*, p. 99.

[72] *Supra*, p. 327.

[73] Korolev, *loc. cit.*

in a situation reminiscent of the 1925-1926 era of initial attempts to introduce "complex" programs in the Second Level (First Cycle) of the Unified Labor School, could only gain knowledge of the individual disciplines while engaged in the study of some "complex" such as "for the collectivization of the village," which in turn might entail such *projects* as the "collection of refuse" and the "struggle with shirkers!"[74] Questions of theory, which was related to the learning of scientific knowledge, were subordinated to the "complexes-projects." By divorcing itself from the systematic learning of the sciences, particularly physics, chemistry, and mathematics, not only did such polytechnization of the school fail to provide graduates with sufficient preparation for studies in the Technicums, but also, it amounted to a gross perversion of the Marxist-Leninist concept of polytechnical education.[75]

With its publication in 1931 of the *Projects of Programs of the FZS* [Proekty programm FZS], a three-volume series, it appeared that the People's Commissariat of Education RSFSR had consolidated the place of the laboratory-brigade, with its emphasis on "complexes-projects," within the existing educational framework of the school. In the introduction to the programs, using the harshest of terms to date, the authors boldly asserted that the new programs would

> ...aid the school actively to fight for maximum acceleration of the rates of the socialist offensive...hold highly the banner of Marxism-Leninism, the banner of dialectical materialism, while successively and steadily carrying out the principle of Party spirit [*partiinost'*] of all the content, methods, and forms of school work.[76]

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[74] *Ibid.*, p. 100.

[75] Cf pp.159-61 (for discussion of the Marxist-Leninist concept of polytechnical education).

[76] Uchebno-metodicheskii sektor Narkomprosa [Educational-Methodological Sector of Narkompros], *Proekty programm FZS* [Project of Programs of the FZS], Vols. I-III (Moscow: Gosizdat., 1931).

The pendulum to which the revival of progressivism clung, however, came abruptly to the end of its swing with the passage of the decree of the Party Central Committee of 5 September 1931.

## "Renaissance" of Imperial education: restoration by legislation

Apart from its abolition of the already virtually defunct Unified Labor School and the reorganization of the school system, the main contribution of the 5 Seotember 1931 decree "On the elementary and secondary school"[77] was to point out and to rectify the prevailing misconception of polytechnical training:

> Any attempt to separate polytechnization of the schools from systematic and thorough assimilation of the sciences, particularly physics, chemistry, and mathematics, the teaching of which must be based upon strictly defined and carefully developed programs and curriculums and conducted in accordance with rigorously established schedules, comprises the grossest distortion of the polytechnical school.[78]

Hence, the Central Committee VKP(b) did not merely hold that the fundamental oversight of the school was its inadequate equipping of the pupils with the bases of general educational knowledge, but it sharply singled out mathematics, physics, and chemistry as the most important areas of a genuinely polytechnical education!

This decree was the first one in the sequence of legislative acts between 1928-1937, summarized in the compendium introduced earlier, which dealt directly with the nature of the educational process in the schools. In the 1932 sequel to it the Central Committee recognized that "significant successes" were achieved, such as changes "in connection with the introduction of universal compulsory education and with the passage to the systematic learning of sciences on the basis of a definite educational plan, program, and time-schedule."[79] It especially commended Narkompros on its educational programs for the First Level grades, which "were significantly improved, higher in volume, and more systematic in the distribution of educational material in comparison with the programs of the preceding years."[80] Once more, the educational programs and practices of the secondary school appeared to pose the most serious problems. In this decree of 25 August 1932, therefore, the Party pinpointed specific prerequisites of educational programs and the process of their implementation at the secondary educational level.

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[77] Cf.p.293 (Table 24 --Compendium of Principal Legislation on Soviet Education, 1928-1937), decree of the TsK VKP(b) of 5 Sept. 1931.

[78] I. K. Andronov, "Polveka razvitiia matematicheskogo obrazovaniia v SSSR" /"A Half Century of Development of Mathematics Education"/, Matematika v shkole /Mathematics in the School/, No. 3 (May-June, 1966), p. 4.

Insofar as mathematics reforms in the school were concerned, the People's Commissariat of Education RSFSR responded immediately to the latter decree by appointing a Commission on Mathematics. This Commission included E. S. Berezanskaia (chairman), R. V. Gangnus, Iu. O. Gurvits, N. T. Zercheninov, E. E. Zotikova, and P. A. Favorskii.[81] The Commission wasted little time in drawing up a standard program on arithmetic, geometry, and algebra for Grades V-VII of the secondary level of the new Polytechnical School.[82] This "remade" program in mathematics, which contained a carefully outlined course of knowledge, was issued yet in 1932.[83] When one considers that the weakness of the program of the secondary grades was not specifically cited until the promulgation of the decree of 25 August 1932, even assuming that the program was not issued until late-1932, its hasty appearance seems somewhat incredulous! Such skepticism is readily dispelled, however, when the nature of the program is closely examined. Based on his analysis of this program, one Soviet mathematician described "just this discipline, and no others" as a return to reduced versions of programs dating from the beginning of the twentieth century, the teaching of which was accompanied by current editions of textbooks first published in the Imperial period.[84] V. M. Bradis, a prominent mathematics methodologist (born in 1890) and corresponding member of the Academy of Pedagogical Sciences, describes the school course of mathematics emanating from the 1931 and 1932 decrees of the Central Committee of the Party as a "*system*, which *reproduces*, in principle, the features of the *system, which took shape in the history of the science*."[85] (Italics mine.) Cherkasov, after having first stated that "new mathematics syllabi *were prepared* [italics mine_7 which exactly outlined the circle of systematic knowledge for each subject (arithmetic, algebra, geometry, trigonometry)," lends confusion to the matter in adding that, "at the same time the syllabi were pruned significantly."[86] He makes no mention of pre-Revolutionary mathematics programs, but one may well ask, just which syllabi "were pruned significantly?" Thus, is the reason for the amazingly quick introduction of the mathematics program for Grades V-VII simply that Soviet education in 1932 borrowed wholesale from Imperial education?

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[79] A. Shokin, "K perestroike nachal'noi i srednei shkoly" /"Toward the Reconstruction of the Elementary and Secondary School"/, Front nauka i tekhniki /Front of Science and Engineering/, No. 9 (Sept., 1932), p. 4.

[80] *Ibid*.

[81] Andronov, *loc. cit*. M. A. Znamenskii, E. D. Zagoskina, P. A. Larichev, and V. E. Fridenberg also participated actively in the work of the Commission.

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[82] *Ibid*.

[83] "Matematika v shkole" ["Mathematics in the School"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I, 665-666.

[84] Iakov S. Dubnov, *Besedy o prepodavanii matematiki* [Discussions on the Teaching of Mathematics] (Moscow: Izd. "Prosveshchenie," 1965), p. 155.

[85] Vladimir M. Bradis, *Metodika prepodavaniia matematiki v srednei shkole* [Methods of Teaching Mathematics in the Secondary School] (Moscow: Gos. uchebnoped. izd. Ministerstva prosveshcheniia RSFSR, 1954), p. 47.

The plight of mathematics instruction in the schools resulted, generally speaking, from its heavy problem orientation, its overwhelming subordination of theory to practice--with a concomitant memorization of "mathematical recipes"[87] and its "fusionism" with all other disciplines in the instructional process, during a decade overladen with progressive "hare-brained schemes." In no other area was this plight more apparent than in the program of the senior class (Grade X) of the complete secondary school. In 1933-1934 it was planned to restore analysis and analytical geometry to the mathematics program of this grade, as had been done for a period of time in Imperial Russia,[88] to the extent that two textbooks were published especially for this purpose.[89] However, Narkompros was forced to abandon this plan, and the generally low level of preparation of students in mathematics was obviously no minor consideration in precipitating this action.[90]

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[86] R. S. Cherkasov, "The Development of the Teaching of Mathematics in Soviet Schools," translated by Bruce R. Vogeli, Manuscript from the personal files of Bruce R. Vogeli (Mathematics Department, Teachers College/Columbia University), p. 3.

[87] Bruce R. Vogeli, "Soviet School Mathematics--Past, Present, and Future" (Department of Mathematics, Bowling Green University, 1964), p. 8.

[88] Cf. p. 199.

How best might Narkompros ensure the fulfillment in the schools of this new emphasis on subject matter, as espoused in the recent decrees of the Party Central Committee? The decrees certainly recognized the importance in the educational process of the role of the teacher, "who was obliged systematically and successively to set forth the discipline taught."[91] This newly entrusted responsibility of the teacher notwithstanding, the actions of Narkompros point to its recognition of the textbook, by virtue of the latter's capacity to be most readily controlled and moulded, as the most important agent of its centralized policies. Accordingly, the assertion that the pre-Revolutionary textbooks of A. P. Kiselev not only were resurrected and revised, but also were made the "official standard,"[92] is correct, except for the areas of elementary arithmetic and trigonometry, where other pre-Revolutionary texts prevailed. It would be premature, however, to think that in 1933 Kiselev's textbooks *immediately* became standard textbooks in all the remaining branches of school mathematics. On the contrary, after the passage of the 12 February 1933 decree of the TsK VKP(b) calling for the preparation and publication of "stable" textbooks by mid-July 1933,[93] Kiselev's textbooks were not immediately adopted as the standard textbooks in both secondary-level arithmetic and geometry. In these areas there were initially adopted textbooks produced during the Soviet era. Nonetheless, as revealed by the following list of textbooks, approved as standard textbooks in 1933 on the basis of the 12 February decree, Kiselev's textbooks eventually did displace Soviet textbooks even here in 1938:

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[89] Dubnov, loc. cit. The two textbooks referred to here were:
Ia. S. Dubnov, Vvedenie k analiticheskoi geometrii / An Introduction to Analytical Geometry / (Moscow: Uchpedgiz, 1935).
I. I. Privalov and S. A. Gal'pern, Osnovy analiza beskonechno malykh / Fundamentals of Analysis of Infinitesimals / (Moscow: Uchpedgiz, 1935).
As a result of the decision of Narkompros RSFSR to reject the introduction of these advanced topics into the mathematics program of Grade X, these books were retitled Textbooks for Teachers / Posobie dlia uchitelei /.

[90] The rejection of this plan, which was actually pronounced by the Institute for Schools, was explained in a less-than-candid manner. It suggested that, since the first task of the school was the organization of the teaching of elementary mathematics, which was adjudged yet to be inferior, the introduction of higher mathematics should be delayed until this task was successfully resolved. Andronov, op. cit., p. 5.

[91] Bradis, loc. cit.

[92] Vogeli, loc. cit.

### TABLE 27

### STANDARD MATHEMATICS TEXTBOOKS APPROVED IN 1933[94]

*Arithmetic*

1) Elementary school: N. S. Popova, *A Collection of Problems and Exercises in Arithmetic for the 1st, 2nd, 3rd, and 4th Grades* /Sbornik arifmeticheskikh zadach i uprazhnenii, I, II, III i IV klassy_/.
2) Secondary school: I. G. Popov, *Aithmetic. A Textbook for the Secondary School* / Arifmetika. Uchebnik dlia srednei shkoly_/. In view of the scientific-methodological shortcomings found in it, the Popov textbook was withdrawn in 1938 and replaced by A. P. Kiselev's

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[93] Cf.p.298 (Table 24 --Compendium of Principal Legislation on Soviet Education, 1928-1937), decree of the TsK VKP(b) of 12 Feb. 1933.

[94] Andronov, *loc. cit*. Some of the mathematical contents of many of the textbooks here listed are reviewed or discussed in greater detail in Bruce R. Vogeli, "The Mathematics Program of the Soviet Secondary School: Its Status and Innovations" (unpublished Ph. D. dissertation, School of Education, University of Michigan, 1959).

### TABLE 27 (Continued)

*A Systematic Course in Arithmetic* [Sistematicheskii kurs arifmetiki], which was revised by Prof. A. Ia. Khinchin and re-issued under the title Arithmetic [Arifmetika].

3) E. S. Berezanskaia, *A Collection of Problems and Exercises in Arithmetic* [Sbornik zadach i uprazhnenii po arifmetike].

#### Algebra

1) A. P. Kiselev, *Elementary Algebra* [Elementarnaia algebra], Parts I and II, revised by A. N. Barsukov.
2) V. M. Bradis, *Four-Place Mathematical Tables* [Chetyrekhznachnye matematicheskie tablitsy].
3) N. A. Shaposhnikov and N. V. Val'tsev, *A Collection of Problems in Algebra* [Sbornik algebraicheskikh zadach], Parts I and II, as revised by the publisher.

#### Geometry

1) Iu. O. Gurvits and R. V. Gangnus, *A Systematic Course in Geometry* [Sistematicheskii kurs geometrii], Parts I and II. Due to the discovery of scientific-methodological shortcomings in the Gurvits and Gangnus textbook, it was withdrawn in 1938. A. P. Kiselev's *Elementary Geometry* [Elementarnaia geometriia], as revised by Prof. N. A. Glagolev, became the standard textbook under the title *Geometry. A School Textbook* [Geometriia. Uchebnik dlia shkol], Parts I and II.
2) N. A. Rybkin, *A Collection of Problems in Geometry for the Secondary* [Sbornik zadach po geometrii dlia srednei shkoly], as revised by V. A. Efremov.

#### Trigonometry

1) N. A. Rybkin, *Plane Trigonometry* [Priamolineinaia trigonometriia], as revised by the publishers.
2) N. A. Rybkin, *A Collection of Problems in Trigonometry with Appended Problems in Geometry Requiring the Application of Trigonometry* [Sbornik zadach po trigonometrii s prilozheniem zadach po geometrii, trebuiushchikh primeneniia trigonometrii], as revised by the publishers.

By drawing heavily upon Imperial Russian textbooks in 1933 and relying on them almost exclusively by 1938, Soviet education cannot be credited with having created its own "stable" textbooks. It did, nevertheless, satisfy two requirements of the resolution of 12 February

1933: the publication of "work books" and "unbound textbooks" was halted; standard textbooks were introduced, which could accommodate the aims of the new programs over a relatively extended period of time.[95]

Indicative of the emphasis of the Party and the Government on the need for progress in bringing order in Soviet education to the study of the foundations of the sciences, particularly the mathematical sciences, was their issuance of awards to two mathematics teachers at about this time. The fact that the recipients, K. P. Arzhenikov (1862-1933) and A. P. Kiselev (1852-1940),[96] were also rather elderly and eminent textbook writers illustrates both the awareness and recognition by official channels of the contributions of the Russian past!

In order to facilitate rapid improvement in the teaching of mathematics, six hours per week were allocated to the study of mathematics in each grade as early as 1932.[97] Mathematics programs for all grades (I-X), which were defined by syllabi stipulating exactly the knowledge and skills to be taught in each grade for each branch (arithmetic, algebra, geometry, and trigonometry), were revised again by Narkompros in 1934.[98] They received official approval that same year also.[99] Such syllabi, including most of the textbooks providing the basis for their implementation, despite their rather accelerated dissemination, remained in effect in virtually the same form[100] from 1934-1955.[101] The following mathematics curriculum was typical for this interim:

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[95] L. A. Tsvetkov, "Fifty Years of the Academic Subject of Chemistry in the Soviet School (Part I)," Soviet Education, No. 7 (May, 1967), 21.

[96] Andronov, loc. cit.

[97] Cherkasov, op. cit., pp. 2-3.

[98] N. N. Nikitin, "Prepodavanie matematiki v sovetskoi shkole 1917-1947 gg." / "Teaching of Mathematics in the Soviet School, 1917-1947" /, Matematika v shkole / Mathematics in the School /, No. 5 (Sept.-Oct., 1947), 21. The reason for the revision of the mathematics

TABLE 28

MATHEMATICS CURRICULUM OF THE SOVIET TEN-YEAR SCHOOL (1934-1955)[102]

| Subject | Grade (hrs./week) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | I | II | III | IV | V | VI | VII | VIII | IX | X |
| Arithmetic | 6 | 7 | 6 | 7 | 7 | 2 | | | | |
| Algebra | | | | | | 3 | 3 | 3 | 2 | 1.5 |
| Geometry | | | | | | 2 | 2 | 2.5 | 2 | 1.5 |
| Trigonometry | | | | | | | | | 1.5 | 2 |
| Review | | | | | | | 1 | .5 | .5 | 1 |
| Total | 6 | 7 | 6 | 7 | 7 | 7 | 6 | 6 | 6 | 6 |

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programs in 1934 was the attempt by Narkompros more exactly to determine the volume and content of knowledge for each of the new types of schools (i.e., the elementary school, the incomplete secondary school, and the complete secondary school), which were established by the 16 May decree of the TsK VKP(b) and the SNK USSR that year, in order to facilitate the transition from one type of school to another. This determination of a minimum mathematical knowledge is a recurrent problem throughout the Soviet period. For an interesting observation by a contemporary Soviet mathematics specialist on this phenomenon, see William K. Medlin, Clarence B. Lindquist, and Marshall L. Schmitt, Soviet Education Programs, No. 17, Bulletin 1960 (Washington: U.S. Government Printing Office, 1960), p. 86.

[99] Cherkasov, op. cit., p. 2.

[100] One of the "major" changes in the mathematics program was the supplanting of the 1933-approved textbooks in secondary arithmetic and geometry by the Kiselev texts in 1938.

[101] Vogeli, loc. cit.

[102] E. N. Medynskii, Narodnoe obrazovanie v SSSR /Public Education in the USSR (Moscow: Izd. Akad. Ped. Nauk., 1952), pp. 74, 86.

While this emphasis of the Soviet Ten-Year School on the teaching of the individual subjects compares favorably with the 1921 Programs of the GUS, taken in its total context (i.e., curriculum, syllabi, textbooks, and methods of teaching), the mathematics program evolving from the succession of Party and governmental decrees in the late-twenties/early-thirties was extraordinarily analogous to the programs of the Imperial Higher Municipal Schools and Gymnasia at the elementary and secondary levels of education, respectively. In terms of its uncompromising rigidity and formalism, which were overcompensating attributes resulting from the victory of systematization over non-systematization, the Soviet Ten-Year School might even be characterized as more traditional than its Imperial counterparts! Within less than two decades, Soviet educational policy, as epitomized by its activities relating to mathematics instruction, had run the complete gamut of reform and reaction according to an essentially circular orbit. The stamping out of all reminders of the stormy period of experimentation in education proceeded as methodically as did the creation also in the early thirties of a firmly entrenched system of education, culminating with the establishment of a single system of general polytechnical schools by the decree of 16 May 1934.[103] Gone by then were: the State Scientific Council, which in 1932 was replaced by the Educational-Methodological Sector of Narkompros RSFSR;[104] the Factory-and-Workshop Seven-Year School

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[103] Cf.p. 301 (Table 24 --Compendium of Principal Legislation on Soviet Education, 1928-1937), decree of the TsK VKP(b) and the SNK USSR of 16 May 1934.

[104] "Gosudarstvennyi uchenyi sovet (GUS)" /"State Scientific Council"/, Pedagogicheskii slovar' /Pedagogical Dictionary/, Vol. I, 279.

(FZS) and the School of the Peasant Youth (ShKM), both of which were transformed into Incomplete Secondary Schools (Grades I-VII) in 1934.[105] Shortly thereafter, in 1940, even the class-oriented Workers' Faculties ceased functioning.[106]

An analysis of the final reaches of this orbit of reform and reaction from 1928-1936, particularly in relation to the legislation that set its course, yields certain major trends in the development of Soviet educational policy, which were as follows:[107]

1) Not only was Soviet educational policy quantitatively oriented during the 1928-1930 period, but also, this orientation was noticeably greatest with respect to the Technicums and higher educational institutions, which were responsible for the preparation of new cadres of scientific specialists--"the most important task of the whole Party" (decree of the TsK VKP(b) of 12 July 1928).

2) There was an extreme emphasis on narrow specialized polytechnical education at all levels during the 1929-1931 period. That is, in contrast to the Marxist brand of general polytechnical education of the early Soviet years, specialization within a particular branch of industry or of the economy was encouraged. Of special relevance here were the decree of the TsK VKP(b) of November 1929 calling for the reorganization of professional-technical education with the reassignment of

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[105] "Shkoly krestianskoi molodezhi (ShKM)" /"Schools of the Peasant Youth (ShKM)"/, Pedagogicheskii slovar' /Pedagogical Dictionary/, Vol. II, 704.

[106] "Rabochie fakul'tety (rabfaki)" /"Workers' Faculties (rabfaks)"/, Pedagogicheskii slovar' /Pedagogical Dictionary/, Vol. II, 246.

[107] For the ensuing discussion, it is suggested that the reader refer, as need be, to pp.287-309 (Table 24 --Compendium of Principal Legislation on Soviet Education, 1928-1937).

numerous VUZs to the jurisdiction of economic/industrial people's commissariats and the 25 July 1930 decree of the TsK VKP(b) replacing the Second Cycles of the Unified Labor Schools with Technicums.[108]

3) Whereas the decree of the Tsk VKP(b) of 12 July 1928 gave lip-service to the matter of quality in the preparation of specialists, the first really substantial movement in this direction began at the elementary and secondary levels in the late-twenties and early-thirties (i.e., the introduction of a ten-year period of study by the SNK RSFSR in early 1929, the 14 August 1930 decree of the TsIK USSR and the SNK USSR introducing universal compulsory elementary education, and the decree of 5 September 1931 of the TsK VKP(b) dealing with the quality of school work in the elementary and secondary schools), whereas a similar movement at the higher educational levels (including the Technicum) was not officially forthcoming until 19 September 1932 (with the promulgation of the decree of the TsIK USSR "On the programs and policy in the higher school and technicums").

4) The return of general educational knowledge of the individual academic disciplines (as opposed to applied or specialized knowledge) as the principal criterion of the quality of polytechnical training at all levels of education by late-1932.[109] (This change in Soviet

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[108] The accelerated growth of the Factory-and-Workshop Seven-Year Schools (FZS) and the Schools of the Factory-Workshop Apprenticeship (FZU) during this same period serves to complement such polytechnical legislation at the upper secondary and higher educational levels, and suggests that the emphasis on polytechnical education went so far as to include the First Level of the Unified Labor School, which formed the basis of the FZS--the basis, in turn, of the FZU.

[109] On the basis of the philosophical discussion of Chapter II (cf.pp. 47-51 ), this tendency might also be referred to as the displacement of the pedagogical attitude of realism by that of classicism in Soviet educational policy by late-1932.

educational policy took place first at the elementary and secondary levels, according to the TsK VKP(b) decrees of 5 September 1931 and 25 August 1932, and next in the Technicums and higher levels of education by the 19 September 1932 decree of the TsIK USSR.)[110] This reorientation of the cognitive content was accompanied by a similar reintroduction of traditional methods of instruction at all levels of education in lieu of the laboratory-brigade and other methodological extremes.

5) *The attack* on progressive programs and practices in the educational process, wherein inroads toward the achievement of quality of academic preparation as the major focus of educational policy were gradually made, *was not only made on a piecemeal basis* (beginning with the reintroduction of general educational knowledge as the basis of the cognitive content of the educational programs and the traditional techniques for its dissemination, followed by the quest for "stable textbooks" [the 12 February 1933 decree of the TsK VKP(b) "On textbooks for the elementary and secondary school" and the 23 June 1936 decree of the SNK USSR and the TsK VKP(b) ], and followed, in turn, by attention to assorted evaluative criteria of the educational process, such

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[110] Indicative of the seriousness of the intent of Soviet educational policy-makers to make this transition from one system of cognitive content to that of another was the stipulation in the 19 September 1932 decree providing for the *dissolution of the State Scientific Council (GUS)* and the transfer of its functions to the Educational-Methodological Sector of Narkompros RSFSR. ("Gosudarstvennyi uchenyi sovet (GUS)" ["State Scientific Council (GUS)"], *loc. cit.*) A subsequent commentary on the earnestness of the regime to remove the remnants of the once undue emphasis on narrow technical education was served by the 21 May 1936 decree of the TsIK USSR and the SNK USSR relating to the All-Union Committee on the Higher School, which abolished the All-Union Committee on Higher Technical Education.

as systems of grading, examinations, promotions, diplomas or degrees, and awards /̲¯dealt with in the 3 September 1935 and 23 June 1936 decrees of the TsK VKP(b) and SNK USSR for the elementary/secondary school and higher educational institutions, respectively_7), but also was repeatedly directed first at the elementary/secondary levels and then at the higher educational levels.[111]

6) Following these attempts all along the educational ladder to improve the pedagogical process of preparing scientific cadres, who were capable of fulfilling the routine high-level manpower demands of the five-year plans, there was a concerted effort to foster and to upgrade the preparation of a core of scientific elite to conduct pedagogical and/or scientific research at the top educational and scientific research institutions. Such endeavors were encompassed primarily in legislation directed in part or in toto at post-graduate or "aspirantura" training (including part of the 19 September 1932 decree of the TsIK USSR, much of the 13 January 1934 decree of the SNK USSR "On academic degrees and titles," and all of the 19 October 1933 decree of the TsK VKP(b) "On agricultural aspirantura"). Certain other legislation, while omitting specific reference to post-graduate training, emphasized the importance of scientific research per se (the "New regulations of the Academy of Sciences USSR" of the SNK USSR of 23 November 1935 and the decree of the SNK USSR and the TsK VKP(b) of 23 June 1936 concerning

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[111] This pattern of priority during the "quality phase" (1931-1936) of this second aggressive stage of Russian education (1928-1936), wherein reforms proceeded successively from the lower levels to the upper levels of education, stood in contrast to that of the "quantity phase" (1928-1930), wherein the upper levels of education were given initial preference.

various qualitative considerations of the work of higher educational institutions).

7) The 11 November 1937 decree of the SNK USSR emphasizing the personal, material, and professional well-being of educational pedagogues and scientific researchers marked the culmination of a logical and natural pattern of development of Soviet educational policy from 1928-1937, whereby changes in educational policy (irrespective of slight chronological differences for the different levels of education) underwent increasing sophistication from primarily quantitative considerations, stressing the almost indiscriminant output of persons having a specialized or applied preparation, to qualitative considerations. These latter considerations stressed the importance of general educational preparation, standard textbooks, objective evaluative criteria of pupils' progress, tried-and-tested (traditional) methods of teaching, and the personal and professional welfare of the leaders and agents of such policy.

The legislation enacted in 1928-1937 resulted, therefore, in the official reinstatement of many pre-Revolutionary principles and practices all along the educational ladder at each level. However, there is sufficient evidence, specifically with regard to the teaching of mathematics at the elementary and secondary levels, to show that many traditional policies had survived or had penetrated anew the educational process long before this "legitimization phase." It was as though the radical pedagogues recognized the waning of their influence with their last-ditch efforts to invoke the "complex-project system" of teaching along with the short-lived, though rampant, return to a "specialization" and/or "vocationalization" interpretation of polytechnical training (instead of the orthodox Leninist-Marxist doctrine of general polytechnical education). That is, polytechnism after 1931 becomes an emphasis on "hard" subject-matter for the special purpose of VUZ preparation, where the large emphasis was on technological and scientific cadres required by the five-year plans of industrialization. Thus, the pragmatic pull on Soviet educational policy, reinforced by the failure of idealistic endeavors to be compatible with the scientific-technical needs of a society undergoing rapid economic industrialization, resulted in the reversal of the "leap forward" tactic by the conservative forces, such that the return to "tried-and-tested" principles no longer occurred in the form of uncoordinated, half-hearted, opportunistic efforts on the parts of individual educators and local educational administrations. Rather, the explicit continuity between Imperial and Soviet education was no longer challenged. Its recognition became perfunctory by virtue of the sequence of sanctions by the centralized apparatus of the State, thereby signalling a close to the "pendulum" behavior of Soviet educational policy and the beginning of a continuous set of policies in Soviet education as we knew it up to recent years.

## CHAPTER VII

## OBSERVATIONS ON THE CONFLICT BETWEEN IDEOLOGY, REALITY, AND HERITAGE IN EDUCATION POLICY

Since such an imposing number of different cultures make up the history of civilization, it seems almost incredible to imagine that there are certain universals common to the development of each of them. One such historical "law," however, is that all cultures are bound, to a greater or lesser extent, to the accumulation of its past. George Spindler, the educational anthropologist, submits, nonetheless, that this bond is not rigid, but rather, is in a constant state of flux:

> Culture is conceived in most instances...as a patterned system of tradition-derived norms influencing behavior. The fact that culture is seen as traditionally derived does not mean, however, that it is conceived as unchanging. Cultural norms are in a constant state of flux. They are traditional in the sense that they exist prior to behavioral events in which people are involved, but they are affected and changed by these events.[1]

The study of the development of Soviet educational policy during the 1917-1936 period, the formative years of the Soviet regime, provides findings that are an objective testimony, if only on a microcosmic scale, to this historical observation. Here in the Soviet case, we see the insistence by a revolutionary regime to pursue new aims and to institute new means for producing a new culture. In the pursuit of these new policies, Soviet policy-makers constantly encountered two major problems that conditioned the outcome of their endeavors. One was the realities that surrounded their overriding effort to bring about a rapid industrialization of the country: the conditions and environment in which society existed. The other major problem was how to deal with Russia's rich educational heritage from the past, which ideologically represented "another world." The fact that the revolutionary regime espoused a new ideology, a new world-view, made compromise with that imperial heritage difficult; but the accumulation of knowledge could hardly be ignored.

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[1] George D. Spindler, Education and Culture (New York: Holt, Rinehart and Winston, 1963), p. 6.

In studying this aspect of the Soviet experience in educational policy, this researcher/author found what he terms the "pendulum-like" effect that the regime's encounter with the two major problems produced. This pendulum effect resulted from the interplay between "change" and "continuity"--the ideological commitment to transform the environment, and the historical fact that a cultural heritage could not be denied. Soviet society could move or progress because it had inherited means to do so. While the Imperial Russian heritage thus exerted a not insignificant influence on the development of Soviet educational policy, we cannot discount the unique achievements of Soviet educators themselves. By examining closely the course of mathematics education, both before and after 1917, the writer has been able to document the ambivalent, if not paradoxical, nature of Soviet education throughout the period under review. This ambivalence subsumes the whole set of conclusions reached in this study. A delineation of the specific conclusions follows.

First of all, it is clear that the ambivalent behavior of educational policy in Russia was not restricted to the post-Revolutionary period. Seen under the lens of mathematics education, Imperial educational policy also followed a somewhat ambivalent path. On the one hand, there was the more traditional and influential policy of the latter decades of the nineteenth century, during which a copious literature on mathematics education appeared, especially in mathematics textbooks, destined to have a far-reaching impact on Soviet education from the 1930's up to very recently. On the other hand, a "progressive movement" occurred generally outside the "ongoing educational policy," roughly during the last decade preceding the October Revolution of 1917 (at least up to the Ignatiev Plan in 1916). Soviet policy-makers tapped both of these periods of the Imperial Russian heritage. That is, the actual policies of the Soviet Government for the reform of education, and of mathematics education in particular, at first made common cause with much of the pre-1917 "progressive movement" that occurred outside the official establishment. However, in the early 1930's, when the traditional nature of education was restored by sharply defined policies established by the Soviet Government and the Communist Party, there was a reintroduction of educational programs and textbooks, especially in mathematics, the antecedents of which can be traced directly to the late-nineteenth century. The widespread revival of A. P. Kiselev's late-nineteenth century textbooks in almost all branches of elementary- and secondary-level mathematics provides an excellent example of this major shift.

In contrast, the "period of experimentation" from 1923-1931, which intervened between such tendencies toward large-scale borrowing, is generally depicted in the literature as that phase when leading Soviet policy-makers relinquished "the experience of the past...within the developing present." Evidence uncovered by this study, however, suggests that educational historians have greatly overplayed and over-indulged in the radical aspects of Soviet educational policy beyond objective tolerances permissible by the historical data of this time. In secondary education generally, and in the upper grades of the secondary level in particular, dissatisfaction with the radical nature of the "complex system" of teaching was obviated in 1926-1927 by such endeavors as, the introduction of "syllabi-minimum" by numerous local/regional commissariats of education and the teaching of various disciplines, especially that of mathematics, "outside the complex." Such movements as these cannot be construed as purely experimental by any stretching of the imagination. Rather, they represent conscious policy endeavors to replant the traditional, to return to programs whose means produced predictable ends. Continuity with Imperial-type traditions, as evidenced by such attempts to retain both a minimum core of mathematics in the curricula and its integrity during a time when the "complex" was the accepted fashion, did not wait for its official sanctioning in the 1930's.

The tendency to equate educational policy at the Second Level during this "romantic period" to its development at the elementary level colors the writing of numerous secondary sources on Soviet education. Overlooked by such generalizations is the traditional mediating role of the secondary school in Imperial and Soviet education between the compulsory, or literacy-elementary level of education, and the higher educational institutions. Radical reforms in the elementary school notwithstanding, the research shows clearly that Soviet educators, willingly or no, continued to consider secondary education as primarily, if not exclusively, a preparation for the VUZ. The same of course with the Rabfak! Hence, the egalitarian dreams of the ambitious and ideologically motivated reformers gave pragmatically way to an old principle of Imperial (and classical European) education which pursued a policy of middle or secondary training for the preparation of elites. In its own way, obviously, the Rabfak was the highest expression of this traditional policy, since it aimed to recruit from the worker-peasant masses likely future leaders in management and politics dedicated to the communist cause (Khrushchev was an example among many).

The rationale for this traditional principle, be it in Imperial or Soviet Russia, was basically the same: to propel the nation toward technological sophistication for reasons both of military and economic security against a rapidly industrializing West. The secondary school could ill pretend to adhere to the same educational policy which simultaneously prevailed in the primary school. What is more, Soviet policy-makers recognized this fact, to wit: the tardy (1925) appearance of the secondary-level Programs of the GUS, with their "complex" orientation, and the official restoration by the GUS of the teaching of mathematics and the other individual subjects in 1927. The point emphasized here is that, through the case-study method of researching into Soviet educational policy (i.e., the study of mathematics educational policy), the genuine character of educational policy of the secondary school is made more manifest. Its development was in many respects unique and well distinguished from that of the elementary school. Whereas the greater relative success of the "complex" in the First Level of the experimental 1920's tends to point to the "change" dimension of the educational policy continuum, a consideration of activities simultaneously taking place in the Second Level points more to the "continuity" dimension of the same. In essence, the evidence shows the dichotomy between policy and practice to have been more generally prevalent at the Second Level of the Unified Labor School, due to the dysfunctional nature of much of the GUS educational policy at the time with a corresponding viability of traditional tried-and-tested teaching practices. Hence, the paradoxes in early Soviet educational policy are not restricted to longitudinal comparisons at different periods of time, but rather, include horizontal, or institutional, comparisons within the same system of education at a given time.

Perhaps the most glaring of these paradoxes is suggested by the nature of the dualism facing Soviet education during the advent (roughly 1922) of the "experimental period." One group of policy-makers (most notably in mathematics education), as already indicated, favored the continuation of the common cause and the expansion thereof of the emergent policy of the pre-1917 "progressive movement." In opposition to them, the more radical Soviet reformers aimed at an educational revolution based on the complete reorientation of the educational process around the "complex," without making the necessary changes with regard to adequate instructional materials and teacher preparation. Hence, the paradox: in the changeover to a radically new regime in Russia, we see in educational policies both a strong tendency by professionals to implement the advanced thinking of the pre-Revolutionary educators and an attempt by the more radical political wing (symbolized by Krupskaia and Blonskii) to overturn completely the principles and practices of education. Indeed, several evidences of historical continuity between Imperial and Soviet policies and practices already cited in this analysis, show that a substantial number of educators, mathematics educators in particular, were influencing and reinterpreting Soviet policies aimed at radical cultural innovation in ways that contravened the official intent. Nevertheless, the apparent failure of both the *moderate* progressives, or professionals, and the *radical* progressives to realize their own educational ideas through successful reform eventually resulted in both factions' forsaking many of their original ideals and joining hands in a mutual reliance in the 1930's on *more traditional educational processes dating from the turn of the nineteenth century*. Thus, we see the impasse reached by the progenitors of the 1907-1914+ progressive reforms in education (especially in mathematics education) and the extreme Party-oriented radicals resolved by an officially directed compromise, whereby there was a restitution of many educational principles and practices honored by the Imperial regime in general, and the late-nineteenth century Imperial regime in particular. Up to only very recently, and in many respects still prevalent today, Imperial policies have held sway in Soviet education.

This episode has much of value for educators in countries facing similar needs to those of the Soviets in the 1920's. Based on the Soviet experience, it also suggests that, despite the usually superior weight accorded political objectives in the unstable years of infancy of a newly emerging, underdeveloped or semi-developed country, eventually policy-makers are forced to come to grips with and to accede to certain unavoidable "rites" of science as a modernizing tool. This would be so even if such scientific training took a primarily "applied" form. The Soviet experience suggests that educational policy is inseparably related to social theory, particularly in light of its implications for culture change. Because of the "sacred cow" aspect of the mathematical and natural sciences, educational policy looms as an ever larger component in the functioning of any modern society. The Soviets themselves conceded this same fact as far back as July 1934, when Premier Joseph V. Stalin stated: "Education is a weapon whose effect depends on who holds it in his hands and who is struck with it."[2] (Italics mine.)

We should not mistake the completion of the cycle of Soviet educational policy development for the period studied, wherein there was a reintroduction in 1931-1936 of many pre-Revolutionary criteria, as a puritanical and staid reversion to Imperial educational policy and practice *en masse*. Soviet educational policy-makers must be credited with having interjected *new lifeblood into an old model*. As their institutional frame of reference in Imperial education, they did not choose the classical Gymnasia, with their greater stress on the study of the humanities and the ancient languages. On the contrary, the mathematics/science oriented Real Gymnasia became one main source of inspiration for Soviet educational pursuits right from the beginning. This "intrigue" never really waned, despite the swinging of the policy-practice pendulum and the frustrations of the first two decades. In fact, the spirit of the Real Gymnasia even pervaded the elementary level of the Unified

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[2] Joseph V. Stalin, *Voprosy Leninizma* [Problems of Leninism] (10th ed.; Moscow: Gosizdat, 1934), p. 610.

Labor School, as evidenced by the greater focus of the latter on the foundations of science. Leading educational policies did aim to reorient the basic culture of Russia toward the industrial age with its very different needs from those of a peasant society, by restructuring the educational enterprise: sharply raising the scientific and vocational-technical content in the general, mass or "proletarian" school (Unified Labor School). The *ways* in which this aim took form and effect *tended to vary considerably* from what top policy-makers originally expected; and so, while the cultural aim remained quite constant throughout the period under study, the implementation of that aim tended to vascillate according to exigencies of the moment--material conditions, available and qualified personnel, instructional materials, etc.--and according to influences of power groups in charge of educational administration (although this political aspect is little discussed in this study, it is occasionally alluded to).

In writings on Russian history, one of the most dominant themes, which too is discussed in Chapter III, is the seemingly inescapable tradition of centralization of the policy- and decision-making apparatus of Russia. This research emphasizes the manifestation of this cultural tradition in both Imperial and Soviet education. While the functioning of the Soviet system of education under the close scrutiny of monolithic centralized control is recognized to be a similarity shared by the Imperial system as well, evidence with regard to the teaching of mathematics, especially the frequent resort of local educational commissariats to the "lip-service" reception of its policies, shows that the People's Commissariat of Education RSFSR did not in fact enjoy the pervasive power, which oftentimes is attributed to it, compared to that held by its Imperial counterpart. Its authority was subject to many of the same limitations which hamstrung the Imperial Ministry of Instruction, thereby evincing the inertial effects of "culture lag" in a society undergoing revolutionary "socialist construction." However, the exigencies of rapid industrialization appear to have been sensed more at the local levels in Soviet Russia than in Imperial Russia. A dormant trait of Russian society--the expression of local initiative--was cajoled into activity by the sense of urgency of the situation, ironically to the extent that it not infrequently led the reform of educational policy, rather than having followed it. That is, this study shows that repeated efforts (often successful) by local educational authorities in Soviet Russia to rectify inadequacies or errors of judgment by central authorities (primarily the State Scientific Council) and/or to carry out measures which local criticisms of central policies had singled out, but which Narkompros RSFSR had ignored, contributed significantly to the reconstruction of educational policies out of the chaos of frequently poor federal leadership. Such a path of policy formulation led often to the reinstatement of more traditional, and therefore more scientific and academic, educational theory and practice than could have occurred had the central policies been fully applied in practice. This outcome is historically significant, both from the standpoint of educational policy and social change, since local educational resources are logical ones on which to rely in periods of change, particularly when lack of consensus in the national bodies brings about indecisions and aimless results--even in the most centralized of educational systems. A recent example is the educational revolt in France.

It is not possible to state with any degree of assurance what appears to have been the balance struck between the most ambitious plans for cultural and social change in education, as stated by Soviet policymakers at the upper echelons, and the ways in which on-the-job educators and local influences modified such "ongoing educational policy" given the latitude created by adjustments in and reinterpretation of official directives. This research does identify some of the most significant determinants of the dichotomy between educational policy and its actual implementation. Such a disparity was most glaring during the experimentation period of the 1920's. Therefore, the most salient feature of this period--the lack of academic and pedagogical literature in the form of textbooks and methods texts, respectively, especially during a pronounced educational reform--seems most detrimental to the merging of policy with practice. A closely related aspect, of course, is the need for teachers to have a working acquaintance with the pedagogical tenets and principles underlying the educational policy set forth. Less obvious is the fact that policies aimed at radical cultural innovation cannot be directed at the different subject areas of the school curriculum with the same degree of rigor, but rather, discretion with regard to the innate peculiarities and relative importance of each subject in the educational process must be observed. One of the common characteristics of the "complex," the laboratory, and the brigade-laboratory systems of teaching was their encouragement of collective studies, and in fact, except for the laboratory method, they tended to repudiate the concept of independent study as a self-sufficient method of learning. While this study does not purport to deal with the general pedagogical implications of the Soviet experience in great detail, it does suggest that group/collective teaching methodologies require greater skill and sophistication on the parts of teachers than do more formal techniques if they are to be genuinely effective. In addition to having rectified many of the defects of the educational policy of the 1920's, the fact that in the 1930's the educational policy of each level of the entire educational system (elementary, secondary, and higher) seemed compatible with both other levels, seems to have been an important factor in embarking more successfully on a rather ambitious, yet traditional, program for mass change. Finally, the evidence of this study suggests that if educational policy is to be successful (i.e., a high correlation between the policy and its implementation in practice) in more than in an isolated or sporadic basis, a high sense of national resolve must be inculcated by the decision-makers, either by forceful or persuasive methods, within the agents and recipients of the educational process. In the Soviet Union this national resolve took the form of State decrees, which initially, in 1928, were tied in with economic planning and goals associated with the First Five-Year Plan of industrialization. The rather rapid achievement of quantitative-type educational goals from 1928-1930 resulted in the qualitative reorientation of this national resolve in educational policy from 1931-1936, when problems in aims, content, and methods were successively raised and resolved. Hence, whereas major trends epitomized by the legislation of 1928-1936 had already gotten underway prior to then, it was not until the political leaders legitimized this shift that there was a sense of national resolve (in this case, bordering on the feeling of a national emergency)--and subsequently, a pronounced convergence of policy with practice.

The probable significance of Soviet experience for developing nations is clear: ambitious educational borrowing from more advanced industrial countries, and bold new strokes of reform by revolutionary idealists, do not easily, if at all, fit into the social and cultural context of the time and place. It indicates that the educational policies and pedagogical practices find their organic links with the ongoing social and economic systems at the grass-roots level. In the Russian case, this meant a substantial resumption of traditional educational ideas and practices. Hence, while the conflict between ideology, reality, and cultural heritage compounds the work of educational policymakers, a pragmatic and flexible assessment of these factors can serve as the *raison d'être* for genuine economic and cultural progress.

In view of these conclusions and observations, the author must classify the period studied as the most interesting and critical one for general educational policy in the entire Soviet period. It was the formative, searching, experimental, shaping period during which Soviet mathematics education sought its proper character and place in Soviet culture. The change agents found that they could not give it that character and place without conceding to the Imperial heritage its role in the continuing present. During the last phase--1931-1936--of that period, the paradox was resolved and Soviet policy in education became set for a generation. Thus a good case can be made for its significance for the Soviet past on the basis of such considerations as: the system of Soviet education having evolved from the 1917-1936 period is essentially the same system that exists today in the Soviet Union; those mathematicians and scientists trained during the 1920's (then aged 18-25 years) are the ones who, in the late-1940's and 1950's (aged 40-55), carried out much of the scientific and technical tasks of the USSR in her period of massive scientific-technical build-up, which characterized Soviet science as we now know and respect it. However, this writer prefers to think of the significance of this research for the future experience, in some cases for the ongoing experience, of contemporary developing countries which, like Russia had, have a rather meagre European tradition, little accumulation of knowledge and scientific traditions and institutions, and lots of borrowed idealism about the promise of revolutionary progress through change by decree.

# APPENDIX

## APPENDIX I

### A SAMPLE "COMPLEX" (GRADE III, FIRST LEVEL OF THE UNIFIED LABOR SCHOOL, 1925)

| Name of "Complex" | Content of Theme & Sub-Topics | Excursions | Laboratory Studies & Observations | Labor Processes | Physics-Mathematics Skills | Skills in the Russian Language | What Students Are to Read & Think Over | Discussion & Action | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| II. Celebration of the October Revolution. | The October Revolution and its significance for workers and peasants of either our village or city. | Participation in a demonstration. | The collecting of memoirs on how the October Revolution came off in our village or city. | The writing of posters. The sketching of personages of leaders of the Revolution. Decoration of the class. The drawing of a graph and diagram of men on strike from 1905-1917. | Calculation of the number of men on strike from 1905-1917; the repetition of all arithmetical operations on numbers of any magnitude. | Collective work: "What the October Revolution gave the workers and peasants." The drawing up and writing of reports: "How we spent the holiday of the October Revolution." | "Propaganda" by Ivanov. L. Trotskii's "Man Will Revel." The reading of appropriate articles from the book of Kovalenskii "Yesterday and Tomorrow." | Recitation: "Forward" by Kraiskii. "The Young Guard" by Bezymenskii. "The Red Banner" by Ionov. "The Iron of the Mass" by Kirillov. "Recollections of Marx" by Kirillov. | — |

Source: I. G. Avtukhov and I. D. Martynenko, Programmy GUS'a i massovaia shkola [The Programs of the GUS and the Mass School] (2d ed. rev.; Moscow: Izd. rabotnik prosveshcheniia, 1925), pp. 230-231.

# BIBLIOGRAPHY

## I. Books, Documents, and Reports

Acton, H. B. The Illusion of the Epoch: Marxism-Leninism as a Philosophical Creed. London: Cohen & West, 1955.

Akademiia nauk SSSR [Academy of Sciences USSR]. Nauka i nauchnye rabotniki SSSR [Science and Scientific Workers of the USSR]. Vols. IV, V, and VI. Edited by Academician E. F. Karskii. Leningrad: Izd-vo Akademii nauk SSSR, 1930, 1934, 1928.

Aleksandrov, P. S., et al. (eds.). Istoriia Moskovskogo universiteta [History of Moscow University]. 2 vols. Moscow: Izd. Moskovskogo universiteta, 1955.

Aleksandrov, V. A. Novye puti k tekhnicheskoi shkole [New Paths for the Technical School]. Moscow: Gos. tekhnicheskoe izd., 1924.

American Association for the Advancement of Science. Soviet Science. Edited by Ruth G. Christman. Washington: American Association for the Advancement of Science, 1952.

Anweiler, Oscar, and Meyer, Klaus. Die sowjetische Bildungspolitik seit 1917. Heidelberg: Quelle and Meyer, 1961.

Avtukhov, I. G., and Martynenko, I. D. Programmy GUS'a i massovaia shkola [The Programs of the GUS and the Mass School]. 2d ed. rev. Moscow: Izd. rabotnik prosveshcheniia, 1925.

Ballinger, Stanley E. The Nature and Function of Educational Policy. Occasional Paper No. 65-101 of the Center for the Study of Educational Policy, May, 1965, Department of History & Philosophy of Education, Indiana University. Bloomington: Indiana University, 1965.

Bauer, Raymond A. The New Man in Soviet Psychology. Cambridge: Harvard University Press, 1959.

Beals, Ralph L., and Hoijer, Harry. An Introduction to Anthropology. New York: The Macmillan Company, 1959.

Black, Cyril E. (ed.). The Transformation of Russian Society. Cambridge: Harvard University Press, 1960.

Boldyrev, Nikolai I. (ed.). Direktivy VKP (b) i postanovleniia sovetskogo pravitel'stva o narodnom obrazovanii; sbornik dokumentov za 1917-1947 gody [Directives of the All-Union Communist Party and Decrees of the Soviet Government on Public Education; a Collection of Documents for the Years 1917-1947 ]. Vols. I-II. Moscow: Izd-vo Akademii pedagog. nauk RSFSR, 1947.

*Bol'shaia sovetskaia entsiklopediia* [Large Soviet Encyclopedia]. 1st ed. Edited by O. Iu. Shmidt. Moscow: Izd-vo Bol'shaia sovetskaia entsiklopediia, 1926-1947. 65 vols.

*Bol'shaia sovetskaia entsiklopediia* [Large Soviet Encyclopedia]. 2nd ed. Edited by S. I. Vavilov. Moscow: Izd-vo Bol'shaia sovetskaia entsiklopediia, 1950-1958. 51 vols.

Bradis, Vladimir M. *Metodika prepodavaniia matematiki v srednei shkole* [Methods of Teaching Mathematics in the Secondary School]. Moscow: Gos. uchebno-ped. izd. Ministerstva prosveshcheniia RSFSR, 1954.

Brickman, William W. *The Changing Soviet School*. Edited by George Z. Bereday, William W. Brickman, and Gerald Read. "The Historical Setting After the Revolution." Cambridge: The Riverside Press, 1960.

Butiagin, Aleksei S., and Saltanov, Iurii A. *Universitetskoe obrazovanie v SSSR* [University Education in the USSR]. Moscow: Izd-vo Moskovskogo gosudarstvenogo universiteta, 1957.

Butts, R. F. *A Cultural History of Western Education*. New York: McGraw-Hill Book Company, Inc., 1955.

Bylinskii, Konstantin I., Mendelev, Ia., and Starodubtsev S. (eds.). *Praktika laboratornykh rabot v shkole* [The Practice of Laboratory Work in the School ]. Moscow: Izd. "Tabotnik Prosveshcheniia," 1926.

Cassidy, Harold G. *Yearbook of the Society for General Systems Research*, Vol. XI (1966), ed. Anatol Rapoport and Ludwig von Bertalanffy. "The University-Community System--Self-Regulated Bearer of Meaning." (Ann Arbor: Society for General Systems Research, 1966).

Chutkerashvili, E. V. *Razvitie vysshego obrazovaniia* [The Development of Higher Education]. Moscow: Gosudarstvennoe izdatel' stvo "vysshaia shkola," 1961.

Conant, James B. *Shaping Educational Policy*. New York: McGraw-Hill Book Co., 1964.

Counts, George S. *The Challenge of Soviet Education*. New York: McGraw-Hill Book Co., 1957.

Crowther, James G. *Soviet Science*. London: Kegan Paul, Trench, Trubner & Company, Ltd., 1936.

DeWitt, Nicholas. *Education and Professional Employment in the USSR*. Washington: Government Printing Office, 1961.

Dossick, Jesse J. *Doctoral Research on Russia and the Soviet Union*. New York: New York University Press, 1960.

Dubnov, Iakov S. *Besedy o prepodavanii matematiki* [Discussions on the Teaching of Mathematics]. Moscow: Izd. "prosveshchenie," 1965.

Eby, F. *The Development of Modern Education*. 2d ed. Englewood Cliffs: Prentice-Hall, Inc., 1952.

Engels, Frederick. *Anti-Duhring* [Herr Eugen Duhring's Revolution in Science]. London: Martin Lawrence Ltd., 1939.

________. *Dialectics of Nature*. Moscow: Foreign Languages Publishing House, 1954.

Engels, Friedrich. *Essential Works of Marxism*. ed. Arthur P. Mendel. "Socialism: Utopian and Scientific." New York: Bantam Books, 1961.

Fischer, George. *The Transformation of Russian Society*, ed. Cyril E. Black. "The Intelligentsia and Russia." Cambridge: Harvard University Press, 1960.

Fisher, Harold N. *American Research on Russia*. Bloomington: Indiana University Press, 1959.

Forsythe, George Elmer. *Bibliography of Russian Mathematics Books*. New York: Chelsea Publishing Co., 1956.

Ganelin, Sh. I. *Ocherki po istorii srednei shkoly v rossii* [Essays on the History of the Secondary School in Russia ]. Moscow: Gosudarstvennoe uchebno-pedagogicheskoe izdatel'stvo, 1954.

Glavprofobr, *Ob uluchshenii kachestva raboty shkoly II stupeni* [On Improvement of the Quality of Work of the School of the Second Level]. Letter no. 14. Gosizdat, 1929.

Gnedenko, Boris V. *Ocherki po istorii matematiki v Rossii* [Essays on the History of Mathematics in Russia]. Moscow-Leningrad: Gos-tekhizdat, 1946.

Good, Carter V. (ed.). *Dictionary of Education*. New York: McGraw-Hill Book Company, Inc., 1959.

Gosudarstvennyi uchenyi sovet [State Scientific Council]. *Novye programmy dlia edinoi trudovoi shkoly. Vypusk I. 1-i i 2-i gody shkoly pervoi stepeni i 1-i god shkoly vtoroi stupeni* [New Programs for the Unified Labor School. Part I. First and Second Years of the First-Level School and First Year of the Second-Level School]. Moscow: Gosizdat, 1923.

Graham, Loren R. *The Soviet Academy of Sciences and the Communist Party, 1927-1932*. Princeton: Princeton University Press, 1967.

Gratsianskii, I. *Matematika v shkole* [Mathematics in the School]. Part II. "Materialy o kompleksnom prepodavanii" [ "Materials on Complex Teaching"]. Leningrad: Izdatel'stvo Knizhnogo Sektora Gubono, 1924.

Gurian, Waldemar. "*Partiinost and Knowledge*," *Continuity and Change in Russian and Soviet Thought*. Edited by Ernest J. Simmons. Cambridge: Harvard University Press, 1955.

Hans, Nicholas A. *History of Russian Educational Policy (1701-1917)*. New York: Russell & Russell, Inc., 1964.

Hessen, Sergius and Hans, Nicholas A. *Educational Policy in Soviet Russia*. London: P. S. King & Son, Ltd., 1930.

Hockett, Homer C. *The Critical Method in Historical Research and Writing*. New York: The Macmillan Co., 1955.

Horecky, Paul L. (ed.). *Basic Russian Publications*. Chicago: The University of Chicago Press, 1962.

________. *Russia and the Soviet Union*. Chicago: The University of Chicago Press, 1965.

Hoselitz, Bert F. and Moore, Wilbert E. (eds.) *Industrialization and Society*. Mouton: UNESCO, 1963.

Hutchins, Robert M. *Education for Freedom*. Baton Rouge: Louisiana State University Press, 1944.

________. *The Higher Learning in America*. London: Oxford University Press, 1936.

International Congress of the History of Science and Technology. *Science at the Cross Roads*. Papers presented to the International Congress of the History of Science and Technology held in London from June 20th to July 3rd, 1931, by the delegates of the U.S.S.R. London: Kniga, Ltd., 1931.

*Istoriko-matematicheskie issledovaniia* /Historico-Mathematical Research/. Vols. I-XV. Moscow-Leningrad Gosudarstvennoe izdatel'stvo tekhniko-teoreticheskoi literatury, 1948-1963.

Johnson, William H. *Russia's Educational Heritage*. Pittsburgh: Carnegie Press, 1950.

Joravsky, David. *Soviet Marxism and Natural Science, 1917-1932*. New York: Columbia University Press, 1961.

Kandel, Isaac L. *The Training of Elementary School Teachers in Mathematics*. Washington: Government Printing Office, 1915.

King, Beatrice. *Changing Man*. New York: The Viking Press, 1937.

King, Edmund J. (ed.). *Communist Education*. Indianapolis: The Bobbs-Merrill Company, Inc., 1963.

Korol, Alexander. *Soviet Education for Science and Technology*. New York: John Wiley & Sons, Inc., 1957.

Korolev, F. F., Korneichik, T. D., and Ravkin, Z. I. *Ocherki po istorii sovetskoi shkoly i pedagogiki 1921-1931* [Essays on the History of the Soviet School and Pedagogy 1921-1931]. Moscow: Izd. Akademii Pedagogicheskikh Nauk RSFSR, 1961.

Lankov, A. V. *K istorii razvitiia peredovykh idei v russkoi metodike matematiki* [On the History of the Development of Progressive Ideas in Russian Methods of Mathematics]. Moscow: Gos. uch.-ped. izd. Min. prosveshcheniia RSFSR, 1951.

Lapirov-Skoblo, Mikhail I. *Puti i dostizheniia russkoi nauki i tekhniki* [The Ways and Achievements of Russian Science and Engineering]. Petrograd: Nauch. khimiko-tekn. izd-vo, 1923.

Lenin, Vladimir I. *Collected Works* [Sochineniia]. Vols. 27 and 30. London: Lawrence and Wishart, 1960.

________. *Materialism and Empirio-Criticism*. New York: International Publishers, 1927.

________. *Selected Works*. Vol. II, Part 2. Moscow: Foreign Languages Publishing House, 1952.

________. *Essential Works of Marxism*, ed. Arthur P. Mendel. "State and Revolution." New York: Bantam Books, 1961.

________. *Two Tactics of Social-Democracy in the Democratic Revolution*. New York: International Publishers, 1935.

Liapin, S. E. *Metodika prepodavaniia matematiki* [Methods of Teaching Mathematics]. Leningrad: Uchpedgiz, 1956.

Liashchenko, P. I. *Istoriia narodnogo khoziaistva SSSR* [History of the National Economy of the U.S.S.R.]. Vol. II. Moscow: State Publishing House, 1948.

*Malaia sovetskaia entsiklopediia* [Small Soviet Encyclopedia]. 1st ed. Edited by N. L. Meshcheriakov. Moscow: Gos. slovarno-entsiklopedicheskoe izd-vo, 1928-1931. 10 vols.

*Malaia sovetskaia entsiklopediia* [Small Soviet Encyclopedia]. 3rd ed. Edited by B. A. Vvedenskii. Moscow: Izd-vo Bol'shaia sovetskaia entsiklopediia, 1958-1961. 10 vols.

Marx, Karl, and Engels, Friedrich. *The Communist Manifesto*. New York: Monthly Review Press, 1964.

*Matematika v SSSR za sorok let 1917-1957* [Mathematics in the USSR for Forty Years, 1917-1957]. Moscow: Gosudarstvennoe izdatel'stvo fiziko-matematicheskoi literatury, 1959.

Medlin, William K., Lindquist, Clarence B., and Schmitt, Marshall L. *Soviet Education Programs*. No. 17, Bulletin 1960. Washington: U. S. Government Printing Office, 1960.

Medynskii, E. N. *Narodnoe obrazovanie v SSSR* [Public Education in the USSR]. Moscow: Izd. Akad. Ped. Nauk., 1952.

Mendelev, Ia. *Praktika laboratornykh rabot v shkole* [The Practice of Laboratory Works in the School]. Edited by K. I. Bylinskii *et al.* "Kabinety i posobiia" ["Cabinets and Training Appliances"]. Moscow: Izd. "Rabotnik Prosveshcheniia," 1926.

Meyer, Adolphe E. *An Educational History of the Western World*. New York: McGraw-Hill Book Co., 1965.

Moore, Barrington, Jr. *Terror and Progress USSR: Some Sources of Change and Stability in the Soviet Dictatorship*. Cambridge: Harvard University Press, 1954.

Moscow. Universitet. *Moskovskii gosudarstvennyi universitet k XX letiiu velikoi sotsialisticheskoi revoliutsii* [Moscow State University on the 20th Anniversary of the Great Socialist Revolution]. Moscow: Izd. Moskovskogo gos. universiteta, 1937.

Narodnyi komissariat po prosveshcheniia [People's Commissariat of Education]. *Gosudarstvennye universitety* [State Universities]. Moscow: ogiz.-izogiz., 1934.

Narodnyi komissariat prosveshcheniia [People's Commissariat of Education]. *Universitety i nauchnye uchrezhdeniia* [Universities and Scientific Institutions]. Moscow-Leningrad: Ob'edinennoe Nauchno-Tekhnicheskoe Izdatel'stvo, 1935.

National Science Foundation. *Current Projects on Economic and Social Implications of Science and Technology, 1964*. Washington: U. S. Government Printing Office, 1965.

Nauchno-Metodicheskii Sovet Leningradskogo Gubono Uchebno-Pedagogicheskaia [Scientific-Methodological Council L.G.O.N.O. Educational-Pedagogical Section]. *Programmy-minimum edinoi trudovoi shkoly* [Programs-Minimum of the Unified Labor School]. Chast' I-Vtoraia stupen' [Part 1-Second Level]. Leningrad: Izd. Knizhnogo Sektora L.G.O.N.O., 1925.

*Novye programmy dlia edinoi trudovoi shkoly. Vyp. I. 1-i i 2-i gody* shkoly pervoi stupeni i 1-i god shkoly II stupeni [New Programs for the Unified Labor School. Part I. First and Second Years of the First-Level School and First Year of the Second-Level School]. Moscow: Gosizdat, 1923.

Pares, Bernard. *A History of Russia*. New York: Alfred A. Knopf, 1958.

*Pedagogicheskaia entsiklopediia* [Pedagogical Encyclopedia]. Moscow: Rabotnik prosveshcheniia, 1927-1930. 3 vols.

Pinkevich, Albert P. *The New Education in the Soviet Republic*. Edited by George S. Counts. New York: The John Day Co., 1929.

________. *Science and Education in the U.S.S.R.* London, Victor Gollancz Ltd., 1935.

Piotrovskii, B. *Matematika v shkole* [Mathematics in the School]. Part II. Review of the 31st ed. rev. of *Elementarnaia algebra* [Elementary Algebra], by A. P. Kiselev. Leningrad: Izdatel'stvo Knizhnogo Sektora Gubono, 1924.

Plekhanov, N. *Praktika laboratornykh rabot v shkole* [The Practice of Laboratory Works in the School]. Edited by K. I. Bylinskii *et al.* "Matematika" ["Mathematics"]. Moscow: Izd. "Rabotnik Prosveshcheniia," 1926.

Podzemskii, Anatolii Ia. *Spravochnaia kniga po narodnomu prosveshcheniiu* [Reference Book on Public Education]. Moscow: Izd. "Krasnaia nov'" glavpolitprosvet, 1923.

Rosen, Seymour M. *Higher Education in the U.S.S.R.* Washington: U.S. Government Printing Office, 1963.

Rubinstein, Modest I. *Soviet Science and Technique in the Service of Building Communism in the U.S.S.R.* Moscow: Foreign Languages Publishing House, 1954.

Samarin, Vladimir D. *Soviet Education*. Ed. George L. Kline. "The Soviet School, 1936-1942." New York: Columbia University Press, 1957.

Shore, Maurice. *Soviet Education: Its Psychology and Philosophy*. New York: Philosophical Library, 1947.

*Slovar' sokrashchenii russkogo iazyka* [Dictionary of Abbreviations of the Russian Language]. Moscow: Gosizdat, 1963.

Solo, Robert. *Economic Organizations and Social Systems*. New York: The Bobbs-Merrill Company, Inc., 1967.

Spindler, George D. *Education and Culture*. New York: Holt, Rinehart and Winston, 1963.

Spulber, Nicholas. *Soviet Strategy for Economic Growth*. Bloomington: University of Indiana Press, 1964.

Stalin, Joseph V. *Voprosy Leninizma* [Problems of Leninism]. 10th ed. Moscow: Gosizdat, 1934.

Standen, Anthony. *Science Is a Sacred Cow* New York: Dutton, 1950.

Tsentral'noe statisticheskoe upravlenie Gosplana SSSR (TsSU) [Central Statistical Administration of Gosplan USSR (TsSU) ]. *Kadry kul'turnogo stroitel'stva; osnovnye dannye o nauchno-prepodavatel'skikh rabotnikakh vuzov narkomprosa RSFSR po otdel'nym otrasliam znanii* [Cadres of Cultural Construction; Fundamental Data Concerning the Scientific-Teaching Workers of *VUZs* of Narkompros RSFSR in the Individual Branches of Knowledge]. Moscow: Gos. uchebno-pedagog. izd-vo, 1931.

Tsentral'noe statisticheskoe upravlenie. Otdel statistiki kul'tury. *Kul'turnoe stroitel'stvo SSSR: statisticheskii sbornik* [Cultural Construction in the USSR: A Statistical Collection]. Moscow: Gosstatizdat, 1956.

Uchebno-metodicheskii sektor Narkomprosa [Educational-Methodological Sector of Narkompros]. *Programmy FZS* [Programs of the FZS]. Moscow: Gosizdat., 1930.

Uchebno-metodicheskii sektor Narkomprosa [Educational-Methodological Sector of Narkompros]. *Proekty programm FZS* [Project of Programs of the FZS]. Vols. I-III. Moscow: Gosizdat., 1931.

Vasil'ev, A. V. *Tseloe chislo* [The Whole Number]. Petrograd: Gos. izd., 1922.

Vavilov, Sergei I. *The Progress of Soviet Science*. London: Foreign Languages Publishing House, 1951.

________. *Tridtsat' let sovetskoi nauki* [Thirty Years of Soviet Science]. Moscow-Leningrad: Izd. Akad. nauk SSSR, 1947.

Veselov, A. N. *Professional'no-tekhnicheskoe obrazovanie v SSSR*. Moscow: Proftekhizdat, 1961.

Volpicelli, L. *L'Evolution de la Pédagogie Soviétique*. Neuchâtel: Delachaux et Niestlé, 1954.

Vucinich, Alexander. *Science in Russian Culture*. Stanford: Stanford University, 1963.

________. *The Soviet Academy of Sciences*. Stanford: Stanford University Press, 1960.

Wetter, Gustav A. *Dialectical Materialism: A Historical and Systematic System of Philosophy in the Soviet Union*. New York: F. A. Praeger, 1959.

Whitehead, Alfred N. *The Aims of Education*. New York: The Macmillan Co., 1955.

## II. Articles and Periodical Literature

Abinder, A. "Akademicheskaia uspevaemost' studentov" ["Academic Progress of Students"], *Nauchnyi rabotnik* [Scientific Worker], No. 3 (March, 1927), 42-50.

Abinder, A. I. "Itogi vstupitel'nykh ispytanii v vysshie uchebnye savedeniia RSFSR v1927 v." ["Results of Entrance Examinations in Higher Educational Institutions of the RSFSR in 1927"], *Nauchnyi rabotnik* [Scientific Worker], No. 10 (October, 1927), 41-54.

Andronov, I. K. "Polveka razvitiia matematicheskogo obrazovaniia v SSSR" ["A Half Century of the Development of Mathematics Education in the USSR"], *Matematika v shkole* [Mathematics in the School], No. 2 (March-April, 1966), 2-12.

________. "Polveka razvitiia matematicheskogo obrazovaniia v SSSR" ["A Half Century of Development of Mathematics Education"], *Matematika v shkole* [Mathematics in the School], No. 3 (May-June, 1966), 4-11.

Arsen'ev, A. "Pedagogicheskaia praktika v dorevolutsionnykh uchitel'skikh seminariiakh Rossii" ["Pedagogical Practice in Pre-Revolutionary Teachers Seminaries of Russia"], *Sovetskaia Pedagogika* [Soviet Pedagogy], No. 9 (September, 1938), 91-109.

Bagretsov, A. "O chem pishut v 'Uchitel'skuiu gazetu' " ["Concerning What They Write in the Teachers' Journal"], *Rabotnik prosveshcheniia* [The Worker of Education], No. 1 (January, 1926), 28-30.

"Bestuzhevskie kursy" ["Bestuzhev Courses"], *Pedagogicheskii slovar*' [Ped. Dictionary], Vol. I (1960), 93.

Briggs, Asa. "Technology and Economic Development," *Scientific American*, 209, No. 3 (September, 1963), 52-61.

Chaplin, A. "Tekhnikumy" ["Technicums"], *Malaia sovetskaia entsiklopediia* [Small Soviet Encyclopedia]. Vol. VIII (1932), 779.

Cheliapov, N. I. "K voprosu o metodakh prepodavaniia v vysshei shkole" ["On the Problem of Methods of Teaching in the Higher School"], *Nauchnyi rabotnik* [Scientific Worker], No. 7-8 (July-August, 1927), 20-25.

________. "Set' vysshikh uchebnykh zavedenii v RSFSR za desiat' let" ["The Network of Higher Educational Institutions in the RSFSR for Ten Years"], *Nauchnyi rabotnik* [Scientific Worker], No. 11 (November, 1927), 70-77.

"Dalton-plan" ["Dalton Plan"], *Pedagogicheskii slovar*' [Pedagogical Dictionary], Vol. I (1960), 298.

Deev-Khomiakovskii, G. "Bezrabotitsa sredi nauchnykh rabotnikov" ["Unemployment Amongst Scientific Workers"], *Nauchnyi rabotnik* [Scientific Worker], No. 10 (Oct., 1928), 53-57.

"Dukhovnye seminarii" ["Clerical Seminaries"], *Pedagogicheskii slovar*' [Pedagogical Dictionary], Vol. I (1960), 362.

"Edinaia shkola" ["Unified School"], *Pedagogicheskii slovar*' [Pedagogical Dictionary], Vol. I (1960), 365-366.

"Fabrichno-zavodskaia semiletka (FZS)" ["Factory-and-Workshop Seven-Year School (FZS)"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 554.

"Frebelevskie kursy" ["Froebelian Courses"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 610.

"Frebelevskii zhenskii, pedagogicheskii institut" ["Froebelion Women's Pedagogical Institute"], *Pedagogicheskii slovar'* [Ped. Dictionary], Vol. II (1960), 611.

"Glavprofobr" ["Chief Administration of Vocational Education"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I (1960), 266.

"Glavsotsvos," *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I (1960), 266.

"Gosudarstvennyi uchenyi sovet (GUS)" ["State Scientific Council (GUS)"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I (1960), 279.

Harbison, Frederick. "Education for Development," *Scientific American*, 209, No. 3 (September, 1963), 140-147.

Iushkevich, A. P. "Matematika i eë prepodavanie v Rossii XVII-XIX vv." [Mathematics and Its Teaching in Russia, 17th-19th centuries"], *Matematika v shkole* [Mathematics in the School], No. 3 (May-June, 1949), 1-14.

Joravsky, David. "Soviet Scientists and the Great Break," *Daedalus*, Vol. 89, No. 3 (Summer, 1960).

"Kabinet matematiki" ["Mathematics Cabinet"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I (1960), 483.

Kaftanov, S. V. "Sostoianie i osnovnye zadachi sovetskoi vysshei shkoly" ["Conditions and Principal Tasks of the Soviet Higher School"], *Vysshaia shkola* [The Higher School], Nos. 6-7 (1938), 6-36.

Kolbanovskii, V. "Tak nazyvaemaia pedologiia" ["So-Called 'Pedology'"]. *Front nauki i tekhniki* [Front of Science and Engineering]. No. 12 (Dec., 1936), 82-93.

Krzhizhanovskii, G. "Adademiia nauk v 1936 g." ["The Academy of Sciences in 1936"] , 7-13.

Labedz, Leopold. "The Structure of the Soviet Intelligentsia," *Daedalus*, 89 (Summer 1960).

"Laboratorno-brigadnyi metod" [Laboratory-brigade Method"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I (1960), 594.

Lilge, Frederic. "Lenin and the Politics of Education," *Slavic Review*, Vol. XXVII, No. 2 (June, 1968), 230-257.

Liusternik, A. A., Shnirel'man, L. G., Gel'fond, A., *et al*. "Deklaratsiia initsiativnoi gruppy po reorganizatsii matematicheskogo obshchestva" ["Declaration of a Group Taking the Initiative for the Reorganization of the Mathematical Society"], *Nauchnyi rabotnik* [Scientific Worker], Nos. 11-12 (Nov.-Dec., 1930), 67-71.

Luppol, I. K. "Problema kul'turnoi revoliutsii i zadachi nauchnykh rabotnikov" ["The Problem of the Cultural Revolution and the Tasks of Scientific Workers"], *Nauchnyi rabotnik* [Scientific Worker], Nos. 5-6 (May-June, 1928), 47-53.

Margulis, A. Ia. "Andrei Petrovich Kiselev," *Matematika v shkole* [Mathematics in the School], No. 4 (July-Aug., 1948), 45-46.

"Matematika v shkole" ["Mathematics in the School"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I (1960), 663-672.

"Materialy na professional'nom obrazovanii" ["Materials on Professional Education"], *Prosveshchenie (-pedagogicheskii sbornik)* [Education (-Pedagogical Collection) ], No. 2 (1922), 136-167.

Medlin, William K. "Approaches to Culture Change Study and Education," *The University of Michigan School of Education Bulletin*, (April, 1963), 102-105.

"Ministerstvo prosveshcheniia" ["Ministry of Education"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. I (1960), 693-694.

"Narodnoe obrazovanie" ["Public Education"], *Malaia sovetskaia entsiklopediia* [Small Soviet Encyclopedia], ed. N. L. Meshcheriakov, V (1930), 568-574.

Nikitin, N. N. "Prepodavanie matematiki v sovetskoi shkole 1917-1947 gg." ["Teaching of Mathematics in the Soviet School, 1917-1947"], *Matematika v shkole* [Mathematics in the School], No. 5 (Sept.-Oct., 1947), 4-22.

Ostrovitianov, K. V. "Zadachi novogo uchebnogo goda i uroki perevykov" ["Tasks of the New Academic Year and Lessons from the Elections"], *Nauchnyi rabotnik* [Scientific Worker], No. 9 (September, 1929) pp. 3-7.

"Pedagogicheskaia akademiia" ["Pedagogical Academy"], *Pedagogicheskii slovar'* [Ped. Dictionary], Vol. II (1960), 103.

"Pedagogicheskie instituty" ["Pedagogical Institute"], *Ped. slovar'* [Ped. Dictionary], Vol. II (1960), 105.

"Pedagogicheskie instituty pri universitetakh" [Pedagogical Institutes attached to Universities"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 105-106.

"Pedagogicheskie kursy" ["Pedagogical Courses"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 106-107.

"Pedagogicheskii institut imeni P. G. Shelaputina" ["Pedagogical Institute named P. G. Shelaputin"], *Pedagogicheskii slovar'* [Ped. Dictionary], Vol. II (1960), 108.

"Pedagogicheskoe obrazovanie" [Pedagogical Education"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 110-113.

Petrovskii, D. "Postanovlenie TsIK o vysshei shkole v deistvii" ["Decree of the Central Executive Committee on the Higher School in Operation"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 9 (Sept., 1933), 67-69.

"Pinkevich" ["Pinkevich], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 127.

Pinkevich, A. P. "Pedagogicheskoe obrazovanie v SSSR" ["Pedagogical Education in the U.S.S.R."], *Nauchnyi rabotnik* [Scientific Worker], No. 11 (November, 1927), 78-87.

Povolotskii, L. "O gruppovykh zaniatiiakh i uchete znanii" ["On Group Lessons and the Evaluation of Knowledge"], *Front nauki i tekhniki* [Front of Science and Engineering] No. 7 (July, 1934), 106-108.

"Progimnaziia" ["Progymnasium"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 183.

"Rabochie fakul'tety" [Workers' Faculties"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 245-246.

"Reviziia Leninskoi teorii kul'turnoi revoliutsii" ["Revision of Lenin's Theory of the Cultural Revolution"], *Bol'shevik* [Bolshevik], No. 15 (1925), 66-77.

Sheremetevskii, V. P. "Matematika i eë shkol'nye surrogaty" ["Mathematics and Its School Substitutes"], *Russkaia mysl'* [Russian Thought], May, 1895, 105-125.

"Shkoly krestianskoi molodezhi (ShKM)" ["Schools of the Peasant Youth (ShKM)" ], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 704.

Shokhin, A. "K perestroike nachal'noi i srednei shkoly" ["Toward the Reconstruction of the Elementary and Secondary School"], *Front nauki i tekhniki* [The Front of Science and Engineering], No. 9 (September, 1932), 80-83.

Shpil'rein, Ia. "O kachestve vysshego tekhnicheskogo obrazovaniia v soiuze" ["On the Quality of Higher Technical Education in the Union"], *Front nauki i tekhniki* [The Front of Science and Techniques], No. 7-8 (July-August, 1932), 101.

Slepkov, A. "Zametki chitatelia o literaturnykh teoretikakh" ["Notes of the Reader on Literary Theorists"], *Bol'shevik* [Bolshevik], No. 16 (1925), 58-65.

"Soiuz sovetskikh sotsialisticheskikh respublik" ["Union of Soviet Socialist Republics"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 383-410.

Travina, A. "V vysshei attestatsionnoi komissii" ["In the Higher Certifying Commission"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 2 (Feb., 1934), 48-49.

Tsvetkov, L. A. "Fifty Years of the Academic Subject of Chemistry in the Soviet School (Part I)," *Soviet Education*, No. 7 (May, 1967), 11-23.

"Uchebnik" ["Textbook"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 534.

"Uchitel'skaia gazeta" ["Teachers' Journal"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 547-548.

"Uchitel'skie instituty" [Teachers Institutes"], *Pedagogicheskii slovar'* [Pedagogical Dictionary], Vol. II (1960), 548.

"Uchitel'skie seminarii" ["Teachers Seminaries"], *Pedagogicheskii slovar'* [Pedagogical Dicktionary], Vol. II (1960), 548.

U.S.S.R., Central Committee VKP(b). "Ob uluchshenii podgotovki novykh spetsialistov" ["On the Improvement of the Preparation of New Specialists"], A resolution adopted by the Plenum of the Central Committee VKP(b) on 12 July 1928, *Nauchnyi rabotnik* [Scientific Worker], No. 8-9 (Aug.-Sept., 1928), 3-9.

U.S.S.R., Council of People's Commissars. "Postanovleniia SNK SSSR ot 13/I 1934 g...." ["Decrees of the Council of People's Commissars USSR of Jan. 13, 1934 - on Academic Degrees and Titles"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 2 (Feb., 1934), 56-57.

U.S.S.R., Council of People's Commissars. "Postanovleniia SNK ot 13/I 1934 g. - o podgotovke nauchnykh i nauchno-pedagogicheskikh rabotnikov" ["Decrees of the Council of People's Commissars USSR of Jan. 13, 1934 - on the Preparation of Scientific and Scientific-Pedagogical Workers"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 2 (Feb., 1934), 57-58.

U.S.S.R., Council of People's Commissars and Central Committee VKP(b). "Postanovlenie SNK SSSR i TsK VKP(b)" ["Decree of the Council of People's Commissars USSR and of the Central Committee VKP(b)"]. *Front nauki i tekhniki* [Front of Science and Engineering], No. 7 (July, 1936), 68-72.

Valeskaln, P. "Povysit' kachestvo podgotovki spetsialistov" ["Raising the Quality of Preparation of Specialists"]. *Front nauki i tekhniki* [Front of Science and Engineering], No. 10 (Oct., 1932), 20-26.

________. "Universitety na vysshuiu stepen" ["Universities to a Higher Stage"], *Front nauki i tekhniki* [Front of Science and Engineering], No. 4-5 (Apr.-May, 1933), 12-15.

Vol'berg, O. A. "Dve mirovozzreniia" ["Two World Outlooks"], *Narodnoe prosveshchenie* [Public Education], Nos. 11-12 (1919).

Voronets, A. "Matematika v shkole" ["Mathematics in the School"], *Pedagogicheskaia entsiklopediia* [Pedagogical Encyclopedia], ed. A. G. Kalashnikov, I (1927), 805-810.

Vygodskii, L. "Pedologiia" ["Pedology"], *Malaia sovetskaia entsiklopediia* [Small Soviet Encyclopediia], Vol. VI (1931), 371.

"Vysshee professional'no-tekhnicheskoe obrazovanie" ["Higher Professional-Technical Education"] *Pedagogicheskaia entsiklopediia* [Pedagogical Encyclopedia]. ed. A. G. Kalashnikov, III (1930), 175-268.

"Vysshie zhenskie kursy" ["Higher Women's Courses"], *Pedagogicheskii slovar'* [Ped. Dictionary], Vol. I (1960), 220.

"Vysshie zhenskie kursy professora V. I. Ger'e v Moskve" ["Higher Women's Courses of Professor V. I. Ger'e in Moscow"], *Pedagogicheskii slovar'* [Ped. Dictionary], Vol. I (1960), 220.

Zaidenvar, I. "Oktiabr' v matematicheskam obshchestve i v institute mekhaniki i matematiki" ["October in the Mathematics Society and in the Institute of Mechanics and Mathematics"], *Varnitso* [changed to *Front nauki i tekhniki* in 1932], Nos. 11-12 (Nov.-Dec., 1930), 73-74.

Zelenko, V. A. "Rekonstruktsiia vsesoiuznoi akademii nauk" ["Reconstruction of the All-Union Academy of Sciences"], *Nauchnyi rabotnik* [Scientific Worker], Nos. 11-12 (Nov.-Dec., 1930), pp. 50-66.

"Zhenskie pedagogicheskie instituty" ["Women's Pedagogical Institutes"], *Pedagogicheskii slovar'* [Ped. Dictionary], Vol. I (1960), 373.

## III. Unpublished Material

Cherkasov, R. S. "The Development of the Teaching of Mathematics in Soviet Schools." Translated by Bruce R. Vogeli. Manuscript from the personal files of Bruce R. Vogeli (Mathematics Department, Teachers College/Columbia University), 1964. (Mimeographed.)

Graham, Loren R. "The Transformation of Russian Science and the Academy of Sciences, 1927-1932" (unpublished Ph. D. dissertation, Department of History, Columbia University, 1964).

Medlin, William K. Soviet Education and Social Reconstruction. A Report to the Council on Foreign Relations, Washington, D.C., June, 1966. Ann Arbor: University of Michigan, 1966. (Mimeographed.)

Tandler, Fredrika M. "The Workers' Faculty (RABFAK) System in the USSR (unpublished Ph. D. dissertation, Teachers' College, Columbia University, 1955).

Vogeli, Bruce R. "The Mathematics Program of the Soviet Secondary School: Its Status and Innovations" (unpublished Ph. D. dissertation, School of Education, University of Michigan, 1959).

________. "Soviet School Mathematics--Past, Present, and Future." Mathematics Department, Bowling Green University, 1964. (Mimeographed.)

Widmayer, Ruth C. "The Communist Party and the Soviet School--1917-1937" (unpublished Ph. D. dissertation. Department of Government, Radcliffe College, Harvard University, 1954).

Zepper, John T. "A Study of N. K. Krupskaia's Educational Philosophy" (unpublished Ph. D. dissertation, University of Missouri, 1960).